THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXV. No. 613.] LONDON, FEBRUARY 9, 1875. [27TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GENUINE TORBAY PAINT
AND
SPECIAL GASOMETER PAINT
(Mixed ready for use).
FOUR PRIZE MEDALS.
WORKS: BRIXHAM, TORBAY.
These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov. 2, 1866.*
London Office, 21, Great Winchester Street, E.C.

PROUD'S
SPECIALITIES IN WOOD GRIDS
FOR
PURIFIERS & SCRUBBERS
MADE FROM THE BEST QUALITY
OF
WELL-SEASONED PLANKS.
BROOKFIELD WORKS,
103, ICKNIELD STREET EAST, BIRMINGHAM.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and OTHER OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.
JOS. COWEN & Co. are the only Manufacturers of FIRE-BRICKS and CLAY RETORTS at BLAYDON BURN.

JOHN RUSSELL AND CO.,
THE OLD TUBE-WORKS, WEDNESBURY;
AND
THE ALMA WORKS, WALSALL.
Established at the commencement of Gas Lighting.
WAREHOUSES:
69, UPPER THAMES STREET;
COMMERCIAL STREET, SPITALFIELDS;
5, CHARLES STREET, SOHO; and
16, SOHO SQUARE,
} LONDON
35, 36, 37, & 39, GRANBY ROW, MANCHESTER.
J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
Lists may be obtained on application to
69, UPPER THAMES STREET, LONDON.

JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS,
OF
FIRST-CLASS MATERIALS & WORKMANSHIP;
Also, STATION-METERS, PRESSURE-GAUGES, STREET-LAMPS, REGULATORS, &c.
ESTABLISHED 1830.

THOMAS PIGGOTT & CO.,
SPRING HILL, BIRMINGHAM.
MANUFACTURERS OF
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Mason's Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
SUGAR, SALTPETRE, AND ALL KINDS OF PANS.
Roofs, Girders, and Bridges, and General Smith's Work.
LONDON AGENT—W. G. DAVIS, 2, Brabant Court, Philpot Lane, E.C.

J. & H. ROBUS,
CONTRACTORS
FOR THE
ERECTION OF NEW & REMODELLING OF EXISTING GAS-WORKS.
RETORT-SETTING A SPÉCIALITÉ.
RETORTS SET, AND GUARANTEED TO BURN OFF A CERTAIN AMOUNT OF COAL, OR ELSE NO MONEY TAKEN FOR THE CONTRACT.
PLANS ON APPLICATION.
Retort-Setters sent to all parts of Europe and America.
Address, J. and H. ROBUS,
BELL GREEN, CATFORD, LONDON, S.E.

THE
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
AGENT:
JAMES M'KELVIE,
HAYMARKET,
EDINBURGH.

GEORGE GLOVER & CO.,
PATENTEES OF THE
NATIONAL STANDARD GASOMETERS
For the English Government, and for the Government of the Netherlands;
MAKERS OF THE DUPLICATE COPY
Presented by Her Majesty's Government to the French Government;
AND MANUFACTURERS OF
IMPROVED
DRY GAS-METERS,
Warranted to Measure correctly, and not to vary.
RANELAGH WORKS, RANELAGH ROAD, PIMLICO, LONDON, S.W.;
236, GEORGE STREET, GLASGOW; AND 15, MARKET STREET, MANCHESTER.

G. G. and Co. have just received the only Medal awarded for Gas-Meters at the Vienna International Exhibition.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

AND

LAP-WELDED IRON AND HOMOGENEOUS METAL BOILER TUBES.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools.

London Offices: No. 4, Cloak Lane, Queen Street, E.C.

WAREHOUSES:

LONDON: 157, UPPER THAMES STREET, E.C.

LIVERPOOL: No. 63, Paradise Street. | PARIS: No. 38, Rue du Chateau d'Eau.

MANCHESTER: Barlow's Croft, Chapel Street, Salford. | LILLE: No. 38, Rue Grande Chaussee.

JOHN HALL & CO.,

STOURBRIDGE,

MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

THE

LANCASHIRE GAS-METER COMPANY,

LIMITED,

FALCON STREET, OLDHAM.

HENRY THOMAS, Managing Director.

GAS PURIFICATION & CHEMICAL Co., LIMITED,

(Successors to JOHN WILLIAM O'NEILL & CO.,)

Offices—PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.,

CONTRACTORS FOR GAS PURIFICATION

BY

OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

JOHN WILLIAM O'NEILL, SAMUEL H. JOHNSON, } Joint Managing Directors.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

London Agent: W. G. DAVIS, 2, BRABANT COURT, PHILPOT LANE, E.C.

HENRY HOWARD & CO.,

COOMBS WOOD PATENT TUBE-WORKS,

OLD HILL, near DUDLEY,

MANUFACTURERS OF

HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

CORE BARS FOR IRONFOUNDERS, STOCKS, TAPS, AND DIES, IRON COCKS, &c.

JOSEPH AIRD,

WELLINGTON TUBE-WORKS, TIPTON, STAFFORDSHIRE,

MANUFACTURER OF

EVERY DESCRIPTION OF TUBING, GAS, STEAM, HYDRAULIC TUBES AND FITTINGS,
EITHER BLACK, GALVANIZED, OR ENAMELLED HOT WATER TUBES AND FITTINGS,
CORE BARS, COILS, COCKS (IRON OR BRASS),
CHANDELIERS, &c., GAS-FITTERS' TOOLS, GAS TONGS, STOCKS, TAPS, DIES, &c., &c.,
HANDRAIL TUBINGS, IRON AND BRASS, PLAIN OR TWISTED,
TELEGRAPH TUBES OR POLES, &c., &c.

PRIZE MEDALS—1862, 1867, 1871, 1874.

SYDNEY LEONI & CO.,

Sole Licensees and Agents for the United Kingdom of Great Britain for

GIROUD'S PATENT RHEOMETER.

This Instrument is easily fixed under any Burner; it regulates the volume of the Gas to be consumed, notwithstanding the Size of the Burner or the Variation of Pressure.

Full particulars on application, also PAMPHLETS on the "Advantages of Heating and Cooking by Gas," with Illustrations, &c., of the latest and most improved

"CHEERFULS,"

And other new Patent Heating Stoves under China and Terra Cotta Covers.

LIBERAL TERMS TO THE TRADE.

ADDRESS:

ADAMAS WORKS, ST. PAUL'S STREET, NEW NORTH ROAD, LONDON, N.

THE

PATENT "UNIVERSAL" STEAM PUMP

WAS AWARDED, AT THE

VIENNA EXHIBITION, 1873,

THE GRAND PRIZE "MEDAL OF PROGRESS."

AT LILLE—GOLD MEDAL - - - - 1874. AT MANCHESTER—SILVER MEDAL - 1874.

OPINIONS OF THE PRESS.

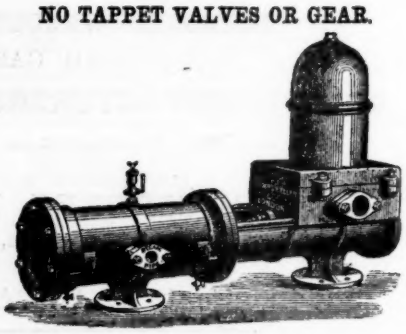
"The simplest machine of its kind."—*Engineering.*

"Remarkable for its simplicity and ease of action."—*Daily Telegraph.*

"None that we have noticed work so quietly."—*The Engineer.*

"Nothing invented in hydraulic steam power half so cheap and effectual."—*Griffith's Iron Trade Exchange.*

NO TAPPET VALVES OR GEAR.



IN USE IN SOME OF

THE PRINCIPAL GAS-WORKS IN LONDON, SHEFFIELD, PENISTONE, &c.,

FOR

TAR AND AMMONIACAL LIQUORS.

ONE SELECTED FROM AMONGST MANY TESTIMONIALS RECEIVED BY H. T. & CO.:—

"*Ardwick Bridge Chemical Works, Manchester, Oct.* 28, 1872.

"Sir,—The 'Universal' Steam Pump obtained from you, and which has been employed during the last six months pumping caustic soda at these works, still continues working satisfactorily,

"Yours truly.

(Signed) "PETER HART, *Manager.*"

SOLE MAKERS,

HAYWARD TYLER & CO.,

84 and 85, UPPER WHITECROSS STREET, LONDON, E.C.

JOHN WRIGHT AND CO., ESSEX WORKS, BIRMINGHAM,

Beg to call the attention of MANAGERS and DIRECTORS of GAS COMPANIES to the following letter which they have lately received.

COPY OF LETTER RECEIVED FROM MAGNUS OHREN, Esq.

Crystal Palace District Gas Company, Lower Sydenham, S.E.

To Messrs. John Wright and Co., Essex Works, Birmingham.

Dear Sirs,—In reply to your inquiries, I am glad to state that the use of GAS COOKING AND HEATING STOVES has been a complete success here. We have several hundred in use in our districts. We also find it advantageous to let out Stoves at a small rental. We have now 275 Stoves at rent.

The Stoves you make I can with confidence recommend, having so many in use, and giving satisfaction. I need scarcely point out to you the advantage to Gas Companies to recommend the use of Gas Stoves to their Gas Consumers, even where they do not supply them on sale or rent, as the use of Gas Stoves brings day consumption, and thus the Company make a profit by day as well as by night.—I am, dear sirs, yours faithfully, MAGNUS OHREN.

Size, 25½ in. high; 14 in. wide; 12½ in. back to front.

Price 50s., complete with Pan and Gridiron.

GAS HEATING STOVES

(TERRA COTTA AND IRON).

THE CHEERFUL STOVE.

COOKING STOVES.

BREAKFAST COOKERS.

BATHS HEATED by GAS

GAS STOVES

For Boiling, Broiling, Preserving, Heating Flat Irons, and for all other Domestic Purposes.

Gas Companies and the Trade who have not our Illustrated Catalogue are respectfully requested to apply for same.

A LIBERAL DISCOUNT to the TRADE.

No. 4003.

THE CHEERFUL GAS STOVE, with Copper Reflector,

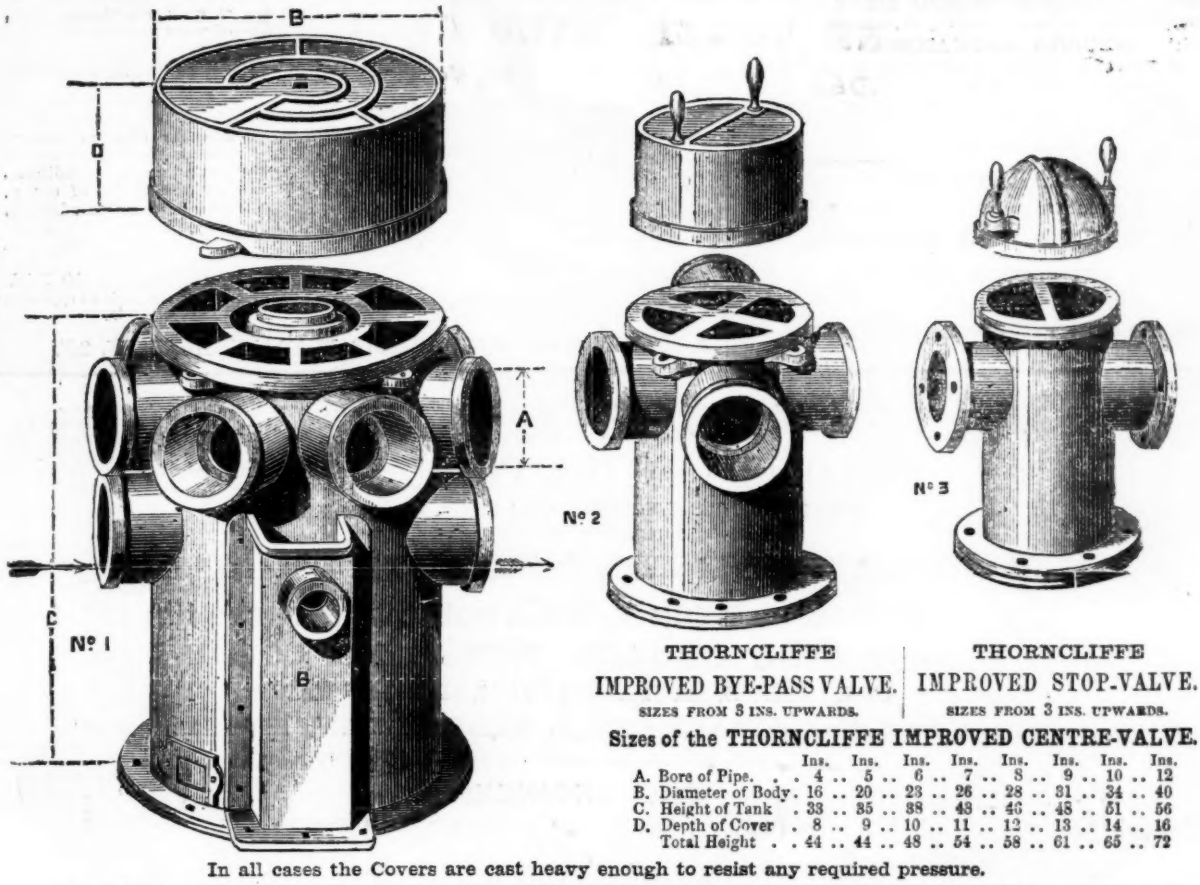
Has all the appearance of a Bright Fire.

PRICE from 32s.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.



THORNCLIFFE IMPROVED BYE-PASS VALVE. SIZES FROM 3 INS. UPWARDS.

THORNCLIFFE IMPROVED STOP-VALVE. SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body.	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

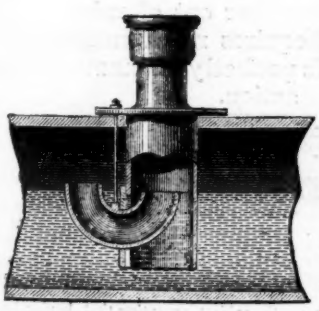
The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



DIP-PIPE, No. 1.

Messrs. N., C., and Co. are also the Sole Agents for

HAWKINS' PATENT SELF-ACTING HYDRAULIC DIP-PIPES.

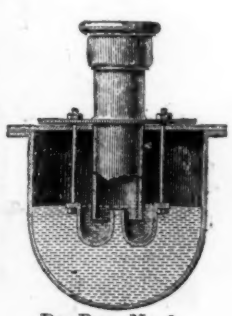
By their use the whole of the pressure caused by the Seal in the Hydraulic Main is entirely avoided, thus securing the many advantages long sought for.

Over 50 Gas Companies have already been supplied with them, many of which have been using them throughout their entire works continuously for over two years.

They can be applied to existing Hydraulic Dips, and at a very small cost.

They seal themselves in the same manner as the ordinary dip-pipes, therefore they are not likely to get out of repair.

By the aid of the adjusting screws they can be made to work on the old principle at pleasure.



DIP-PIPE, No. 2.

FOR PRICES, TESTIMONIALS, &c., APPLY TO

Messrs. NEWTON, CHAMBERS, & CO., Thorncliffe Iron-Works, near Sheffield, Sole Agents

OR TO THE PATENTEE,

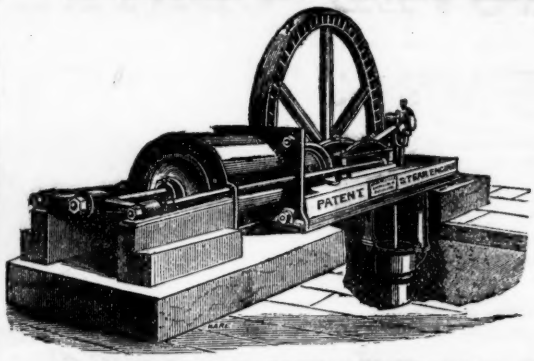
J. G. HAWKINS, NEEPSEND GAS-WORKS, SHEFFIELD.

INTERNATIONAL EXHIBITION, 1862.
CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and
"HONOURABLE MENTION" for
good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE.

TO GAS COMPANIES, ENGINEERS, &c.
WOOD SIEVES.—WOOD SIEVES.
Estimates given and Contracts taken by the Manufacturer
GEORGE MACKANESS,
36, EDWARD STREET, HAMPSTEAD ROAD,
LONDON, N.W.
These Sieves are made with parallel or bevel bar, and guaranteed to be well seasoned yellow deal, and not common spruce so generally used.
N.B.—Specimens sent free on application.

B. CARPENTER,
THE ORIGINAL MANUFACTURER OF
WOOD SIEVES
FOR
GAS PURIFIERS & SCRUBBERS.
WORKS:
22, HERMES STREET, PENTONVILLE ROAD,
LONDON, N.

ECONOMY OF FUEL IN STEAM-ENGINES.
B. DONKIN & CO.,
PATENT HORIZONTAL COMPOUND CONDENSING
STEAM-ENGINES,
APPLICABLE FOR DRIVING GAS-EXHAUSTERS.



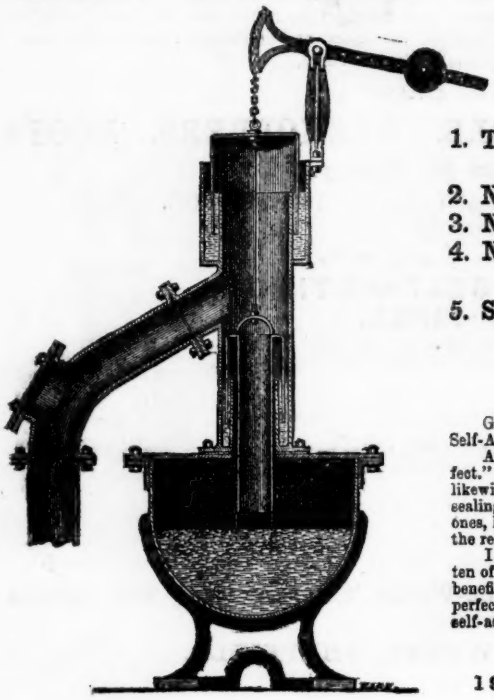
These Engines have been at work a sufficient number of years to prove their durability and efficiency.

One of them has been subjected to a scientific and exhaustive trial to test the consumption of fuel, with the result that an expenditure of less than 2 lbs. of coal per hour developed one indicated horse power.

Full Details of this Trial, and Prices, sent on application to
B. DONKIN & CO., BLUE ANCHOR ROAD, BERMONDSEY, S.E.

HODGE & CO.'S
IMPROVED VENTILATING SUN-LIGHTS
WITH TALC REFLECTORS AND SELF-ACTING VALVES
TO PREVENT DOWN-DRAUGHT;
VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.
Ormolu, Bronze, & Crystal Gaseliers;
MEDIÆVAL CHURCH WORK AND CORONÆ
COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;
COLUMNS, BRACKETS, & STREET LANTERNS;
BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.
GAS ENGINEERS,
100, HATTON GARDEN, LONDON.
Drawings and Prices upon application.

SELF-ACTING REMOVABLE DIP-PIPE,
PATENTED BY
CHANDLER & STEVENSON.



ADVANTAGES.

1. There is no pressure on the Retorts.
2. No deposit of Carbon.
3. No scurfing is required.
4. Never a choked Ascension-Pipe.
5. Saves Fuel and Wear and Tear.
6. Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
7. Is never out of order.
8. Requires no attention.
9. Is perfectly automatic in its action.

TESTIMONIAL.
Metropolitan District Asylum, Caterham, Surrey, Dec. 14, 1874.

MESSRS. CHANDLER AND STEVENSON.

GENTLEMEN,—I have much pleasure in bearing testimony to the complete working of your "Patent Self-Acting Dip-Pipes," which have now been in constant operation over three months.

As regards the action of the apparatus, I can describe it no better than by calling it "simply perfect." Immediately the retort is charged and the lid secured, the small holder rises, which lifts the Dip; likewise the instant the gas is permitted to escape at the mouthpiece the holder falls, thus perfectly sealing the Dip. I am fully convinced of the superiority of these Self-Acting Dips over Non Self-Acting ones, having experienced the fact that stokers do occasionally neglect to unseal the Dip after charging the retort, thereby causing a waste or loss.

I feel that it is quite unnecessary for me to say more on the subject, excepting that, having had ten of Messrs. Chandler's Dip-Pipes in use more than one year, and having experienced the great benefits derived thereby, inasmuch as the yield of gas from the coal is greatly increased, and the retorts perfectly free from carbon and other advantages, and seeing that the same Dip has been made perfectly self-acting by the second patent, I feel convinced that this is the right thing.—Yours obediently,

W. CRICKMAY, Resident Engineer.

For terms of use and cost, apply to Mr. G. W. STEVENSON,
19, GREAT GEORGE STREET, WESTMINSTER.

TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

HUNT'S PATENT
EQUILIBRIUM GAS GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from lenkage through insufficiency of seal, tilting, &c., is entirely avoided.

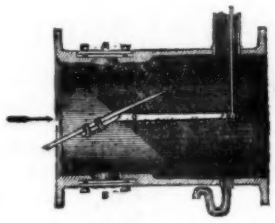
The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

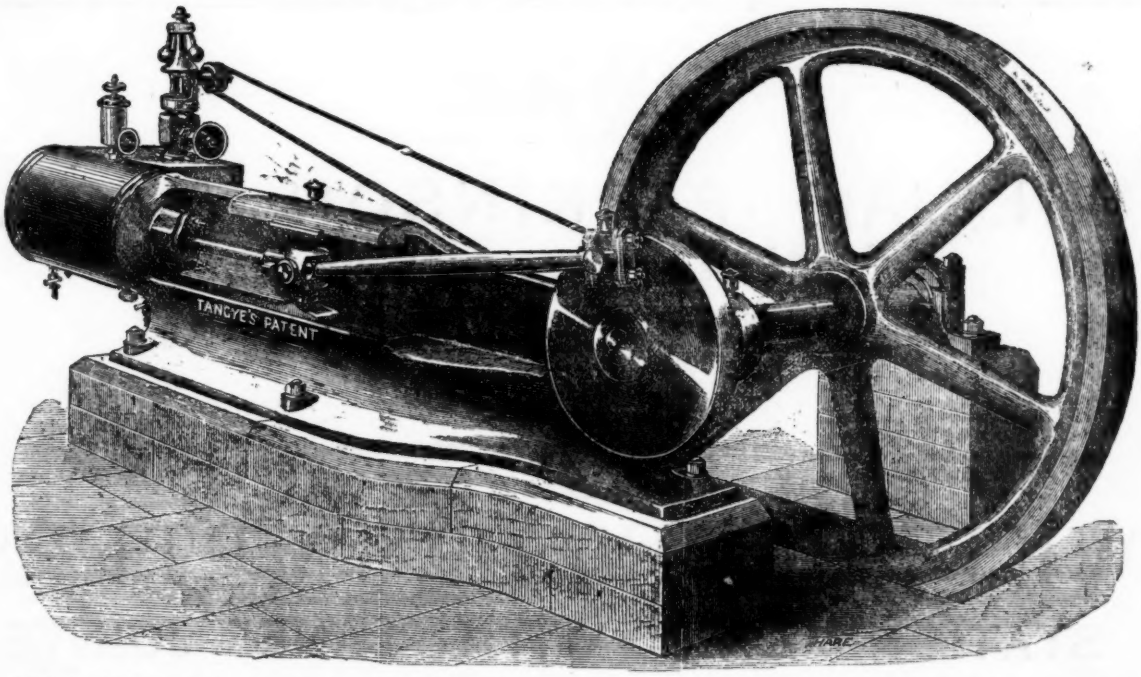
These Governors have been adopted by several leading Gas Companies, among whom are the following:—

The Gaslight Company—two 36 in. at Blackfriars.
" " a 36 in. at Goswell Road.
" " a 24 in. at "
" " a 24 in. at Whitechapel.
" " an 18 in. at Bow Common.
" " a 24 in. at Beckton.
" " a 6 in. at "
The London Gas Company—a 24 in. at Nine Elms.
" " an 18 in. at "
" " an 8 in. at "

The Exeter Gas-Works—a 24 in.
The Abergavenny Gas-Works—a 10 in.
The Birmingham Gaslight Company—an 8 in.
The Monmouth Gas-Works—an 8 in.
The Devonport Gas-Works—an 8 in.
The Cannes Gas-Works (France)—an 8 in.
The Mentone Gas-Works (France)—an 8 in.
The Rochdale Gas-Works—a 4 in.
The Imperial Gas Company, a 12 in at Great Cambridge Street.



TANGYE'S HORIZONTAL HIGH-PRESSURE EXPANSIVE
STEAM-ENGINES.



In designing this Engine the utmost regard has been paid to simplicity of arrangement, strength of construction, and economy in cost. The working parts are considerably reduced in number, as compared with Horizontal Engines generally, rendering it far more durable and compact. The bed-plate, front cylinder cover, guides, and plummer-block for crank-shaft bearing being all cast in one piece, which in design and proportions is admitted by competent engineers to be perfect, and to afford a strength and rigidity that cannot possibly be attained in the best fitted engines of the ordinary horizontal type. The extraordinary stiffness of this Engine will permit of its being driven at a much greater maximum speed than engines generally, and with far less wear and tear. The cylinder with its valve-chest is bolted to the end of the bed. The cross-head slippers and connecting-rod ends are made adjustable, so that any wear can be readily taken up. The fly-wheel, cylinder-end, connecting-rod, and crank-plate, are all bright. All the parts are made to Whitworth's Gauges, and the material and workmanship are of the highest class throughout.

The Governor is of a very special description, and combines in the small space usually occupied by the ordinary steam stop-valve, a governor, throttle-valve, and stop-valve complete. It is exceedingly sensitive, simple, and compact.

Number	B	C	D	E	G	H	J	K	M
Nominal Horse Power.	2	3	4	6	8	10	14	18	25
Price of Engine . . .	£32	£38 15	£46	£70	£90	£115	£145	£185	£200
Feed Pump, extra . .	£3	£3 15	£4	£5 10	£6	£7 10	£8	£10	£15
Diam. of Steam Cylinder	4 in.	5 in.	6 in.	8 in.	9 in.	10 in.	12 in.	14 in.	16 in.
Length of Stroke . .	8 "	10 "	12 "	16 "	18 "	20 "	24 "	28 "	28 "

London 1851. New York, 1853 Paris, 1855. London, 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF PATENT

WET & DRY GAS-METERS,

STATION-METERS WITH PLANED JOINTS,

GOVERNORS, PRESSURE REGISTERS, GAUGES,

AND EXPERIMENTAL APPARATUS,

STREET-LAMP METERS,

AND REGULATORS FOR AVERAGE METER INDICATION.

METERS FOR MEASURING WATER.

CONTENTS.

Circular to Gas Companies:— Page
The Regulation Bill of the Metropolitan Board and Corporation 177
An Experiment on Public Lighting in the City 177
The Vestry of Paddington and the Average Meter System 178
Public Lighting at Ryde 178
The New Gas Company 178
Proposed Purchase of the Blackburn Gas Company by the Corporation . . . 178
The Corporation of Manchester and the Extension of the Gas-Works . . . 178
The Movement for the Repeal of the Borough Funds Act 178
Gas Affairs at Colchester 178
Lighting on the Shaftesbury Park Estate 178

Water and Sanitary Notes:—
The Queen's Speech and Promised Sanitary Legislation 178
The Corporation of Manchester and their Water-Works 178
The Central Chamber of Commerce and Local Taxation 179

Leading Articles:—
The Water Bills for 1875 179
A Treatise on the Science and Practice of the Manufacture and Distribution of Coal Gas 180

Correspondence:—
The Revivification of Gas Liquor 182
Meter-Indexes 182
Frozen Gas-Meters 183
Purifiers at the Alloa Gas-Works 183

Parliamentary Intelligence:—
Gas and Water Bills, 1875 183

Legal Intelligence:—
Recorder's Court, Dublin—Wilson *v.* The Alliance and Consumers Gas Company 183
Thames Police Court—Wilson *v.* The Gaslight and Coke Company 183
Sheffield Police Court—Discharge of a Workman for Violation of the Rules of the Gas Company 184

Miscellaneous News:—
Galashiels Water Supply 183
Reductions in the Price of Gas 184
Public Lighting at Ryde 184
Metropolis Gas Supply 185
Metropolis Water Supply 186
Metropolitan Board of Works and the Water Companies 186
Extraordinary Suicide in Paris 186
Birmingham (Corporation) Gas and Water Bills 187
Birmingham (Corporation) Gas Bill 187
Hull Gas Supply 187
Society of Engineers 187
Manchester (Corporation) Gas Supply 188
Manchester (Corporation) Water-Works 188
Average Meter System in London 189
Application of Illuminating Gas to the Pyrophone 189
Premiums for Sanitary Improvements in Liverpool 189
Explosion in a Purifier-House 189
Iron and Coal Trades of Sheffield, South Yorkshire, and North Derbyshire . . . 190
Iron and Coal Trades of South Staffordshire and East Worcestershire . . . 190
Iron and Coal Trades of Lancashire 190
Coal and General Trade of the North 190
Trade Notes from Scotland 190
Kirby-Moorside Gas and Water Company 191
Municipal Corporations (Borough Funds) Act 191
Bray Gas Supply 191
Wakefield Water Bill 191
Aberdeen (Corporation) Gas-Works 191
Institution of Civil Engineers 191
Weardale and Shildon Water-Works Company 191
Rats and Gas-Pipes 191
Rothesay Water Company 191
A Gas Engineer's Silver Wedding 191
Frodsham Gas Company, Limited 191
Street Lighting in the City of London 191
Rating of the New River Company's Sources of Supply 191
Bodmin Gas Consumers Company 192
Protection of Buildings and Ships from Fire 192

Register of New Patents:—
Applications for Letters Patent 192
Grants of Provisional Protection 192
Notices to Proceed 192

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 9, 1875.

Circular to Gas Companies.

On the printed *agenda* paper of the Metropolitan Board of Works for last Friday no notice was given of any proceedings to be taken which concerned the gas supply of the metropolis; but, as our readers will see in another column, a report from the Parliamentary Committee was brought up, which embodied "suggestions" agreed upon by the committee of the Board and the Gas Committee of the Corporation of London, to serve as a basis for the preparation of the much talked-of Gas Regulation Bill. Now, we feel that we have a right to complain of the omission of any mention of this matter in the notice paper. If we are correctly informed as to the days on which the two committees meet, there was ample time for notice to be given, at all events, on a supplemental paper. Such a supplemental paper was indeed issued, but we believe we are correct in stating that some members of the Board did not know of the intention of the Parliamentary Committee to present a report on the gas question until they arrived at Spring Gardens. The consequence of this omission was that our reporter was not in attendance, and we have to apologize to our subscribers for presenting the best report we can make up from the pages of some contemporaries. It may be considered conceit on our part, but we must say that we greatly prefer our own reports of all proceedings relating to our speciality, and we say this without making any reflection on those of the contemporaries from whom we borrow. With the expression of a fervent hope that such a glaring omission may never again occur, we proceed to notice the suggestions which the Metropolitan Board have agreed to, on the recommendation of their Parliamentary Committee.

The first, "that the conditions to be applied to all the gas "companies should, as far as possible, be uniform," will rather puzzle the parliamentary draughtsman. The next, "that the "illuminating power of the gas supplied shall be 16 candles," is of no consequence, because that is practically the quality of gas now supplied all over the metropolis. The third involves the question of price, and suggests that the "*standard*" price shall be 3s. 9d. per 1000 feet. Now, we are in doubt whether or not "standard" means maximum price. It is perfectly clear to us that the majority of the London companies will never be able to supply gas for less, and, probably, not long for so little as 3s. 9d.; and the Metropolitan Board, if they had the works, would be compelled to charge more. Taking it, however, to mean the actual price, we see considerable force in the arguments employed by some South London members, who are evidently in fear of a levelling up of price, but, at present, we think, without reason. There seems in this Bill to be no suggestion of amalgamation, and the South Metropolitan Company may not find it necessary to charge as much as 3s. 9d. for years to come. For the present, therefore, and without amalgamation, uniformity of price will not be attainable. If, however, it should be insisted upon, will the Board explain to us how an excess of profits made by one or two companies can be applied to the reduction of the price of gas in the case of others? We are glad to see that the Board do not wish to alter the maximum rate of dividend; and, as regards clause 5, we may say that, we should have no objection to the proposal to reduce the dividend whenever the standard price is exceeded, if it were coupled with the condition that a higher dividend than 10 per cent. would be allowed whenever the price was lower than the standard. The standard, however, ought to be at least 4s., if the dividends are to be affected. Clauses 6 and 7 illustrate the *entente cordiale* established between the Corporation of London and the Metropolitan Board. The interest of the former in the general gas question is so exceedingly minute, that we do not see why they should be asked to consent to amalgamation, or be privileged to elect a referee. St. Pancras or Paddington have quite as much right to have a voice in these matters. Wishing to see the day-consumption of gas for heating purposes increased, we are inclined to object to the eighth proposal, which is to compel the maintenance of the minimum illuminating power throughout the 24 hours. As regards clause 9, we must object to the suggestion that the test-burner shall be the one now in use, and prescribed by the late referees. Our contention is, that the companies should have the advantage of the best possible burner, and we believe that Mr. Sugg has recently made a great improvement in the London Argand. For this reason, therefore, we must protest against establishing "finality" in the test-burner, or bothering Parliament whenever a change is to be made. We do not think that much need be said about the remaining suggestions. An auction clause has now become so common a feature in gas Acts, that, however unfair we may consider it to investors, who laid out their money relying on the Companies Clauses Act for opportunities of increasing their gains, we do not protest. The proposal of clause 10 was anticipated by Lord Redesdale years ago. The suggestion of the appointment of an official auditor for all the companies need not be objected to, but, if there be an official auditor, we see no necessity for giving the Corporation and Board of Works the power to pry into the books of the companies. Such a power could only lead to unnecessary disputes, by which the accountants of the public authorities would seek to increase their reputations and their salaries.

Very little need be said about the discussion. When the Bill has been drawn, and the matter is to come again before the Board, we must request that due notice be inserted in the *agenda* paper, so that we may have the opportunity of knowing what takes place. For this occasion our readers must take the best report we can give them. The prospects of the measure we shall not discuss at length until the actual Bill is before us, but we may now express our belief that a "standard" price of 3s. 9d. cannot be accepted without the revision clauses of the Acts of 1868-1869, and that the reduction of dividend, as proposed, will not be acceded to.

An experiment in public lighting, on the butchers plan, has been tried in the City of London, to which we have not alluded, because we were in daily expectation that it would be discontinued. A large ring with, we forget how many jets (we counted them once), was substituted for five lamps, at a crossing opposite the Mansion House. The light was wonderfully effective when the wind was still, but necessarily uncertain in a breeze. The five lamps cost £30 a year; but the ring of jets is estimated to cost £150 a year. It is not to be wondered at that some members of the Commissioners of Sewers are anxious to see the ring removed, and the lamps relighted; and, with all our desire to see the consumption of gas increased, we feel bound to express our opinion that the novel

mode tried is extravagant and wasteful. As good an effect might be obtained at very much less cost. Another new lamp is, it appears, to be tried in the City, from which excellent results are anticipated.

The vestry of Paddington, like their neighbours in St. Pancras, are rejoicing over their success with the average meter system. The average consumption per lamp, it appears, has been only 4¼ feet per hour, and that is all the vestry pay for. We rather think the money saving to the parish is estimated at about £1600 a year.

A curious experiment has been made in Ryde, where, it seems, the police have for some time been charged with the duty of extinguishing the public lamps at their discretion. In a very moral town like Ryde, where, we presume, the police have nothing else to do in the small hours, this is all very well. Burglars never work at daybreak. But there is a doubt, which we share, whether the employment of the police as lamp extinguishers is legal. The meter system evidently does not satisfy some of the Town Council, but it is clear the regulators are at fault. Some parsimony, we suspect, was exercised with respect to these, or there could not be a consumption of 9 or 10 feet per hour.

We have a small and quite unimportant correction to make, but we do it inasmuch as it always is our intention to be accurate. The inventor of the "New Gas" was not, as we stated last week, to receive £150,000, but only £125,000. The total sum subscribed and paid up was, we understand, £92,000, and out of this £50,000 was paid to the vendor, the remainder of the purchase-money being taken, as agreed, in fully paid shares. A committee, we believe, are to be, or have been, appointed to report on the past history of the company and its prospects.

The Corporation of Blackburn are said to be negotiating for the purchase of the gas and water undertakings. As both companies are in a highly prosperous state, the Corporation will have to pay the full price.

The Corporation of Manchester, it might have been thought, would not hesitate a moment about extending their gas-works, but from a report of a meeting of the council, which we publish elsewhere, it will be seen that the Gas Committee have for years endeavoured to provide for the future, and anticipate coming exigencies, but without success. The works, they show, are scarcely able to supply the present winter demand, and if the consumption increases at the normal rate, they will be quite unequal to the demand of 1876. Under these circumstances, the Gas Committee ask for power to erect new works on a site they bought for the purpose five years ago. The council appear to hesitate, but, perhaps, the objection is rather to the site than to the expenditure of money. The Corporation, we notice, are seeking power to raise £250,000 for gas purposes, so it is likely that new works will soon be commenced.

We gather from several local papers that the memorial to the Home Secretary, to which we referred last week, and which we ascribed to the Municipal Association, is being circulated by the Local Board of Penrith, but at whose expense we are unable to say. It is not to be supposed that a miserable little place like Penrith can have any serious grievance against a gas or water company. We take it, then, that the Local Board are only set in motion by some wire-pullers who do not care to show their hands. On this matter we may mention, that the Liverpool Householders Association are taking vigorous action to secure the preservation of the Municipal Corporation (Borough Funds) Act. They will be joined in their efforts, we hope, by independent associations of ratepayers all over the country. The Borough Funds Act is the Magna Charta of ratepayers.

We are glad to note that the Sevenoaks Gas Company and the Local Board are in a way to a satisfactory arrangement. Gas, it is quite clear, has been very bad in Sevenoaks, and the Board have a legitimate grievance. Five shillings per 1000 feet is a very fair price, and the entire absence of sulphuretted hydrogen should be insisted on. For their own sakes, the company should remove as much ammonia as possible, and we would recommend them to set up a small plant for the manufacture of sulphate of ammonia, which would command a ready sale in their neighbourhood.

The inhabitants of Colchester are resolute in their determination to oppose the Bill of the gas company, who will, we rather think, obtain the sympathy of Parliament. An increased maximum is absolutely necessary for the company, and we are astonished that any tradesman, who has power to raise the price of his goods according to his will, should oppose the Bill. The money the Council will spend in opposition might be devoted to many better purposes.

The inhabitants of the Shaftesbury Park estate have been asked to light their streets and houses with mineral oil lamps instead of gas. We sincerely hope they will make the experiment. No one can dispute the beauty and intensity of the light given by these lamps, nor can anybody question the cheapness, if the cost of oil only be taken into consideration. There, however, we believe the advantage ends. As regards safety, there can be no comparison between the dangers arising from the use of oil lamps, and those which come of the use of gas. We have almost every week to record explosions of gas, but they are seldom fatal, and cases of suffocation are rare. In the United States, however, it is said that 2500 people are annually killed by explosions of petroleum lamps—that is, they are burnt to death—and 22,000 persons are seriously injured. As regards healthiness, it is a well-established fact that gas vitiates the air to a less extent than any other illuminating agent. The notion that the use of oil lamps will save the consumption of coal is puerile in the extreme. But the inhabitants of the Shaftesbury Estate are free to do as they like, and, as we said before, we hope they will try the experiment of keeping gas off the estate. We feel very confident as to what the result will be.

Water and Sanitary Notes.

The message of Her Majesty to Parliament indicates that the Government are about to inaugurate "their policy of sewage." We quote the Opposition phrase, but everybody knows that the Journal of Gas Lighting has no political object:—"Bills are "to be introduced for facilitating the improvement of the dwell-"ings of the working classes in large towns, for the consolidation "and amendment of the sanitary laws, and for the prevention of "the pollution of rivers." The first of these objects is a very desirable one, but the measure proposed will require close scrutiny. It is, we rather think, intended to give local authorities power to apply public funds to providing improved dwellings, and also to enable private companies to make compulsory purchases of lands, and dilapidated properties, for the same purpose. The work required to be done in this direction is enormous, and the utmost that can possibly be done within the next quarter of a century will be but as a drop in the ocean. Clearing out one neighbourhood only results in the overcrowding of another, and great judgment will be required to ensure that the evil it is proposed to remedy shall not be exaggerated.

The consolidation and amendment of the sanitary laws is highly desirable. The confused mass of legislation now existing only perplexes members of Local Boards, and taxes to the utmost the brains of their clerks to expound it. A simple sanitary code is surely possible, and with this we hope the Government will furnish us. Any measure for the prevention of the pollution of rivers will require very close watching. Nature intended and made rivers for drains, but, undoubtedly, they have been very much abused. The just right of towns, however, to their use, must be well considered; and, whatever conditions for the future are laid down, they must be reasonable, and possible of fulfilment. Most of the impurities—perhaps all—flowing from factories, may be stopped or neutralized before they reach a river, sometimes economically, but more often by incurring expense, and this expense will be so much added to the cost of the commodity manufactured. Here is a matter which, in these days of severe competition with foreigners, must be taken into consideration. The trade of this country must not be sacrificed for the existence of a few salmon, and the amusement and profit of riparian proprietors.

It is a lamentable thing that some of our greatest necessaries cannot be produced without the evolution of a stink. It is a fact, however, and a number of gentlemen with delicate noses, and some, we are bound to say, with reasonable grounds of complaint, appeared before the President of the Local Government Board the other day, to ask the interposition of Government with regard to "noxious manufactures." The term "noxious" is most often an inappropriate one. Bone-boiling, manure-making, and tallow-melting, produce stenches, but they are not "noxious"—that is, they are neither prejudicial to health, nor injurious to vegetation. Judicious arrangements would prevent the escape of much of the unsavoury matter; but they would involve expense, and, as we have said, an increased cost of production. Copper-smelting, no doubt, as at present carried on, allows the escape of vapours which are injurious to vegetation; but then comes the question, which may be broadly stated thus—Which is the more profitable to the country, copper-smelting or cabbage-growing? We hope it may eventually be settled that the two operations can be carried on in close proximity; but, at present, we can only protest against hasty sensational legislation, to which, however, Mr. Sclater-Booth is evidently not inclined.

The loss on the Manchester Water-Works during the past year appears to have been £10,008, and the estimated deficiency for the present year is set down at £3084. While admiring the public spirit which makes Manchester submit to these losses, we can only once again protest that the deficiencies ought not to be made good out of gas profits. The public water-rate should be

5d. instead of 3d., and it would appear that the water-works would then pay their expenses. The Corporation are before Parliament for power to raise £500,000 for the purpose of the water undertaking, and there can be no doubt that both the public and domestic rate must eventually be raised.

Manchester, it seems, is able to borrow on easier terms than the City of London, at which nobody will be very much surprised. But the Corporation ought not to be led into extravagance because they can borrow cheaply. They have, however, just resolved to borrow another million of money, which will raise the indebtedness of the City to, we rather think, five millions. Some people are beginning to grow uneasy at the rapid growth of the debts of local authorities, and we may here quote some remarks from the report of the Local Taxation Committee of the Central Chamber of Commerce:—

From the figures of the present return (of local taxation) it would appear that the rates now levied exceed £18,500,000 a year, and that £4,400,000 of tolls, dues, and other local taxes are raised, while a further sum of nearly £10,000,000 (in which borrowed moneys are usually included) makes up the local revenue to a total very little short of £33,000,000. The outstanding debt of local authorities is returned at over £72,000,000, of which very nearly £44,000,000 is stated to be secured on the rates, a figure which would be still further increased had account been taken, as does not appear to have been done, of the £1,500,000 at which the liabilities of School Boards stood at Michaelmas, 1873. These sums afford undeniable evidence of the magnitude and growth of the charges imposed exclusively on ratepayers, while it is impossible to view without uneasiness the increase year by year in the debts of local authorities. The rapid development of these liabilities manifests the inelastic and insufficient nature of the existing resources of localities, and their inability to provide out of income the outlay required to meet the increasing demands of the present day.

THE WATER BILLS FOR 1875.

THERE are 15 Bills for the incorporation of companies with powers for the supply of water.

The *Broadstairs Water-Works Bill* is to incorporate the Broadstairs Water-Works Company, Limited. The present capital of the company is £10,000, in shares of £5 each, and it appears that £8000 has been paid up and expended. In the reconstruction of the company, it is proposed to classify and consolidate the shares so as to make them of the nominal value of £10 each, which involves the necessity of creating half shares. Power is sought to raise £5000 additional capital, the dividend on which is limited to 7 per cent., and also to borrow £5000. The Bill is further to confer the ordinary powers, and to compel a constant supply. The domestic rate is to be 6¼ per cent. on annual value, with 5s. a year for an extra closet, and 6s. a year for every bath holding more than 25 gallons of water. The Broadstairs Water Bill is to incorporate a company to take over the private works of Messrs. Richardson and Wright. The preamble alleges that the present supply—that of the company just named, we presume—is bad and unwholesome in quality, and inadequate. The capital proposed for the new company is £12,000, with the usual borrowing power. The supply is to be constant. The domestic rate is to vary, according to annual value, from 5⅛ to 3¾ per cent. Closets beyond two are to be charged 4s. or 8s. a year, each according to the value of the house, and every bath is to be charged 8s. a year. Power is sought to make and enforce regulations for the prevention of waste and misuse, and all the usual general powers are prayed for.

The *Busby Water Bill* is to incorporate a new company, with authority for the construction of works for the supply of the village of Busby, and adjoining district, in the counties of Lanark and Renfrew. The capital proposed is £10,000, with the usual borrowing power. The domestic rate is not to exceed 1s. 6d. per pound of annual value, with 6s. a year for closets beyond one, and 9s. for every bath. The use of water for other than domestic purposes is to be prohibited without agreement with the company, who seek power to compel owners and occupiers to take water if their supply otherwise is deemed insufficient. Power is sought to enforce regulations, proposed in a schedule, which are of the usual character and stringency.

The *East Northumberland Water Bill* is to incorporate a company with power to supply a large district in East Northumberland. The works proposed are extensive, and the supply is to be obtained by collecting and impounding the water of several streams in the district. The capital of the company is to be £200,000, with borrowing power to the usual extent. Power is sought to make contracts for the supply of water to various local authorities, and also to the Blythe and North Shields Water Companies. The other provisions in the Bill are to confer the ordinary powers and privileges.

The *Galashiels Water Bill* is to incorporate a company with power to supply Galashiels and certain neighbouring parishes. The water is to be obtained by impounding the river Lugate. The reservoirs are to be constructed to the satisfaction of an engineer to be appointed by the sheriff; and, for the prevention of accidents, the sheriff will, on complaint being made, have power to order the water to be let off, and necessary repairs made. The capital of the company is to be £30,000, and power is sought to borrow £10,000. All the usual powers and privileges are asked for, and authority is prayed to sell the undertaking to the Town Council or public commissioners of Galashiels, whenever they desire to purchase it.

The *Maidenhead Water Bill* is to incorporate a company, a rival to that applying for a Provisional Order (*ante*, p. 148), with power to supply the same district. The capital proposed is £20,000, carrying the usual borrowing power. The source is to be a well in the parish of Cookham, and the rates are to be about as usual. The Bill proposes that the Corporation of Maidenhead shall have power to purchase the undertaking at any time within ten years, power being taken by the company, in the meantime, to contract with the Corporation for the supply of water in bulk.

The *Market Rasen Water Bill* is to incorporate a limited company formed in 1873, with a nominal capital of £5000, none of which has been raised, nor have any works been commenced. This Bill proposes that the capital of the incorporated company shall be £10,000, with the usual borrowing power. The rates are about as usual, and the company seek all the ordinary powers.

The *Neath District Water Supply Bill* is to incorporate a company formed to take over, under an agreement already made, the undertakings of the Neath Water Company, which now furnish a supply to Neath and Briton Ferry. The capital proposed is £150,000, with borrowing power to the extent of £40,000. The old company (Neath Water) is not to be dissolved, but the new company this Bill proposes to incorporate are to pay them 10 per cent. on the capital expended on the Neath undertaking, and any balance of profit is to be divided among the proprietors of the Briton Ferry undertaking. When, however, the works authorized by this Bill are completed, the share capital of the Briton Ferry undertaking is to be merged into that of the new company, The additional source of supply is to be obtained by impounding the river Pelenna. There is nothing further in the Bill that requires notice.

The *Peterborough Water Bill* is to incorporate a company with power to supply water to the borough of Peterborough and surrounding district. The works proposed include the sinking of a well, and impounding the Braceborough Spa stream. The capital proposed is £80,000, with the usual borrowing power. The Bill proposes a constant supply at the pressure that can be afforded by the service reservoir, and another supply, which need not be constant, at a pressure which is not to exceed 15 feet above the constant supply. The domestic rates, and all other provisions, are about as usual.

The *Portishead District Water Bill* is to incorporate the Portishead District Water-Works Company, Limited. The original capital of the company is £32,000, and this will authorize £16,000 additional, the dividend on which is limited as usual. Power is sought to divide the £10 shares into preferred and deferred half shares. Borrowing power to the usual extent is asked for. The works made and proposed are not described in the Bill. The rates proposed are about as usual, and the customary powers, including that of making and enforcing regulations, are sought for. The mains laid are to bear in their whole length a mark to distinguish them from gas are mains; and, except on sudden emergency, the water company is to give the gas company 24 hours notice before they open the ground.

The *Stafford Water Bill* is to incorporate a company with power to supply the borough of Stafford and neighbourhood. The capital proposed is £40,000, with the usual borrowing power. The water is to be taken from some pools and brooks, one of the former being utilized as a storeage reservoir. The domestic rates vary according to annual value, and are what is now commonly charged. All the ordinary powers of a water company, including that of making and enforcing regulations, are inserted. The Bill further asks authority to sell the undertaking at any time to the Corporation of Stafford.

The *Stafford District Water Bill* is to incorporate a rival company with authority to supply rather more extended limits. The capital proposed is £60,000, with the usual borrowing power. The source of the water is a pond and brook, called Copmere. All the common provisions are inserted in the Bill, and, as in the case above, power is sought to sell the undertaking to the Corporation at any time.

The *Stroud Water Bill* is to incorporate a company with authority to supply Stroud and the neighbouring parishes, all in the county of Gloucester, and with power to purchase the water undertaking of the Stroud Local Board, and any other undertaking within the limits of the Act. The capital proposed is £72,000, in £10 shares, but authority is sought to divide the shares into preferred and deferred half shares. Borrowing power to the usual extent is sought. The works proposed are not described. The domestic rate is not to exceed 6 per cent. on annual value, with the usual charges for baths and extra closets. Water supplied by meter is to be charged for at the

rate of 1s. 6d. or 1s. per 1000 gallons, according to quarterly consumption. The other provisions are of the ordinary kind.

The *Truro Water Bill* is to incorporate a company with power to supply Truro and the neighbourhood. The source of the water proposed is the Tregurra or Milltown stream. The capital of the company is to be £16,000, carrying the usual borrowing power. The rates proposed are about as usual, but all inns and hotels above the annual value of £5 are to be charged 7½ per cent. All the ordinary powers and privileges are sought.

The *Worksop Water Bill* is to incorporate a company with power to supply the parish of Worksop, Notts. The source is to be a well in the sandstone. The capital proposed is £12,000, with the usual borrowing power. The domestic rates are those commonly charged. All ordinary provisions are inserted in the Bill.

The following are Bills for granting additional powers to companies already incorporated:—

The *Blackburn Water-Works Bill* is to empower the Blackburn Water-Works Company to construct additional works for impounding brooks or streams. The present capital of the company is £169,285, of which £144,285 has been paid up and expended. The company have also exercised their borrowing power to the extent of £15,845. Additional capital, to the amount of £200,000, is now proposed, and the usual borrowing power is asked for. Power is sought to make and enforce regulations for the prevention of waste.

The *Chelsea Water-Works Bill* is to empower the Chelsea Company to remove their intake from Seething Wells to a point above Moulsey Lock, and to authorize additional capital to the amount of £40,000, with the usual borrowing power. The Bill contains provisions for the protection of gas and water companies whose mains may be interfered with. By one section, they make it obligatory on their part to repair immediately any damage at the works which allows unfiltered water to pass, but they propose no penalty in case they neglect such an obvious duty.

The *Eastbourne Water Bill* is to empower the Eastbourne Water Company to construct and maintain additional works. The authorized capital of the company appears to be £14,330, but, in addition to this, they have raised and spent £23,670. This latter sum the Bill proposes to convert into stock, to be called Improvement Stock, which is to be distributed rateably among present shareholders, and to be entitled to a 7 per cent. dividend. Power is further asked to raise £30,400 additional capital, the dividends on which are to be limited as usual. The ordinary borrowing power in respect of the new capital is asked for.

The *Kilmarnock Water Bill* is to empower the Kilmarnock Water Company to make and maintain additional works, to defray the cost of which they seek authority to raise £10,000 additional capital, with power to borrow £3300 in respect of it. There is nothing else in the Bill which requires notice.

The *Leicester Water Bill* has been mentioned before. It is to give the Leicester Water Company power to raise £100,000 additional capital, and to borrow to the usual extent. The Corporation of Leicester, who now hold capital in the company to the amount of £42,500, will, if this Bill should pass, be empowered to take up more.

The *Pontypridd Water Bill* is to empower the Pontypridd Water-Works Company, with a present capital of £6000, to raise additional capital to the amount of £30,000 for the construction of new works. Usual borrowing powers are, of course, applied for. The Bill asks that the original capital of £6000 may be converted into preference capital entitled to 5 per cent., but provides that the additional shall be entitled to 7 per cent. or 6 per cent., according as it is issued in ordinary or preference shares. Some common powers are applied for, which need not be detailed.

The *Slough Water-Works Bill* is intended to repeal the Slough Water-Works Act, 1868, which incorporated the Slough Water-Works Company, with a nominal capital of £20,000, in shares of £100 each. The company have raised and expended about £11,000, and now by this Bill seek for reconstruction, with power for the division of the present shares into 10, and the issue of the remainder of the capital in £10 shares. No additional capital is asked for; and perhaps the most important part of the Bill is that by which power is sought to sell the undertaking to the Local Board of Slough, for which purchase, and for all eventualities resulting, due provisions are proposed in the Bill.

The *South Staffordshire Water-Works Bill* is to empower the South Staffordshire Water-Works Company to sink new wells and construct new works, and also to extend their limits of supply. The present capital is £400,000, and by this Bill it is proposed to raise an additional £200,000. The company have now no mortgage debt, so the usual borrowing powers are asked in respect of both original and additional capital. Saving clauses for the protection of the Corporation of Walsall and some gas companies are contained in the Bill, and all the usual powers and privileges of a water company, including that of making and enforcing stringent regulations are introduced.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

L.

The notice of the processes used for the purification of gas must not be concluded without a reference to that patented by Mr. William Mann (No. 3263, A.D. 1871). In this we find the first published description of a plan for the systematic use of a sulphide, whether of calcium in a purifier, or of ammonium in a scrubber, for the removal of bisulphide of carbon. "My invention," says Mr. Mann, "is based on the fact that the sulphides of the alkalies and alkaline earths combine with bisulphide of carbon;" and he goes on to describe an arrangement of purifiers, in one of which he secures the presence of sulphide of calcium. Then having arranged other purifiers for the removal of *all impurities*, except the bisulphide, he passes the gas through the sulphide of calcium, and completes the purification. In like manner with the scrubbers, the principle laid down is to first free the gas from carbonic acid and sulphuretted hydrogen, and then to bring it into contact with sulphide of ammonium, by which the bisulphide of carbon is eliminated from the gas. Unfortunately, there is a want of precision in the description of the mode of producing the sulphides. Mr. Mann was notoriously successful with purification; but any one who had his specification, and was not acquainted with his practice, would be rather confused. It is, however, but simple justice to Mr. Mann to place on record the fact that he was one of the first to recognize the conditions required for the effectual removal of bisulphide of carbon.

The Station-Meter.

For our present purpose it will be sufficient to limit our observations to the meter as the "station-meter," which, in its general construction, is almost identical with the wet meter employed by consumers. In describing, therefore, the former, the principle of the construction of the latter will be understood, and hereafter, when treating on "distribution," the progressive history of consumers meters, both wet and dry, will have our attention. We may here observe the singular circumstance that, although we are indebted to the French for the word meter, or measure, yet in that language the instrument is called "*compteur*," or counter, a name which it has received in other Continental languages.

The importance of the station-meter in a gas-work, but more particularly in small establishments, where the utmost care and accuracy are necessary in order to earn a dividend, is hardly susceptible of exaggeration, for, by this instrument, all the gas produced is measured and recorded hourly and daily; it serves as a check on the quantity and quality of coals carbonized; it shows whether the operations in the retort-house are being successfully conducted or otherwise, and, so far as regards the production and sale of gas, it affords unerring means of ascertaining the operations of the company. In addition to these advantages, the station-meter, when properly constructed, is amongst the most durable of all the apparatus in a gas manufactory. Once placed, it requires no attention, and during a series of years is a faithful recorder of all the gas produced.

On the other hand, when this instrument is dispensed with, it is practically impossible to ascertain, with any strict degree of accuracy, the quantity of gas manufactured and sold. To determine this in its absence, constant reference has to be made to the gas-holders, the contents of which are continuously influenced by every change of temperature in the atmosphere, perhaps at one hour, in consequence of the gas being expanded by the heat of the sun, showing an extraordinarily fabulous production, and at another period, with reduced temperature, no production whatever. Moreover, when a holder receives and delivers the gas simultaneously, it is utterly impossible to ascertain the quantity produced. It is obvious, therefore, on these accounts, that, for economical working, the instrument in question is indispensable.

For the station-meter, that known as the "wet meter" is universally adopted. In some few instances, the "dry meter" has been tried for the purpose, but has invariably resulted in failure, occasioned by the large accumulation of condensed liquid therein, which impeded its action. However desirable, under certain conditions, the latter instrument may be for consumers, it is quite unsuitable as a station-meter for a gas-work.

In the history of the gas-meter, which appeared in the columns of this JOURNAL about 25 years ago, its author displayed considerable ingenuity, and took great pains, by description and illustrations, to demonstrate that the wet meter was an adaptation of the Archimedean screw. He further suggested that the *clepsydra*,* or time measurer, of the ancients might have led to the invention. These assertions were at that time contradicted, through the same medium, by Clegg, who denied that there was any analogy between the meter and the instruments from which it was pretended to be derived. We hope to be able to confirm that opinion, and to show clearly that the first idea of the construction of the meter originated in Clegg's rotary gasholder, for this is the principle conveyed in the first patent

* The *clepsydra* was constructed in several ways; but that alluded to by the author was a small cylindrical vessel made of thin sheet metal, with closed ends, and divided into three or more distinct compartments. This was attached to an axle which revolved freely in its bearings. On the axle was fixed a drum or pulley, round which passed a cord, and to this was suspended a weight. Each of the partitions had a very small hole pierced therein, close to the periphery of the cylinder; and one of the compartments being partially filled with water, it was then hermetically closed. The action of the weight caused the water to flow from one compartment to another and the cylinder to revolve, and the time required for this being accurately ascertained, the dial to record the hours was arranged accordingly.

obtained by him, and retained by John Malam, and which exists in the meter as now universally manufactured.

In making these assertions, we have assumed that the rotary gasholder was invented prior to the meter, and we are led to this conclusion from our knowledge of the fact that the former apparatus was erected and in use at Peter Street station a considerable period before Clegg left the Chartered Company, which occurred early in 1817. And, if we reflect on the time that would be required in those days to construct a vessel of such complication and magnitude, and bear in mind the date of his patent, we may fairly infer that the idea of the rotary gasholder first occurred to Clegg, and from this the invention of the gas-meter followed.

We find amongst the greatest impediments experienced by Samuel Clegg, in his early erections of gas-works, were the difficulties in constructing the tanks of gasholders. At that time cast iron was at a fabulous price, and the advantages of hydraulic cements were hardly known; and these difficulties were naturally augmented in proportion to the depths of the tanks. He, therefore, devoted his great abilities to find a remedy for this evil, by inventing descriptions of gasholders which should require tanks of very limited depth. The first of these was the "rotary holder;" the other, which he patented in 1818, he termed the "collapsing holder," of which a representation was given in the JOURNAL, vol. xxiv., p. 82.

The accompanying figure (1) represents a section of the rotary gasholder, as constructed by Clegg: *t* is the tank filled with water, and provided with a wooden frame, *f f*, for the purpose of carrying the annular vessel or gasholder, *v*, which in cross section was rectangular, and was closed at the end, *c*, and opened to the atmosphere at the end marked *a*. By means of suitable framing, *g g g*, the holder, *v*, was attached to a central hollow shaft, which worked in a corresponding stuffing-box. The pipe, *p*, connected the hollow shaft with the end of the holder, *c*, and served to convey the gas into and from that vessel, the arrows indicating the passage of the gas thereto. One end of the chain, *h*, passed round, and was attached to, the drum, *s*, which

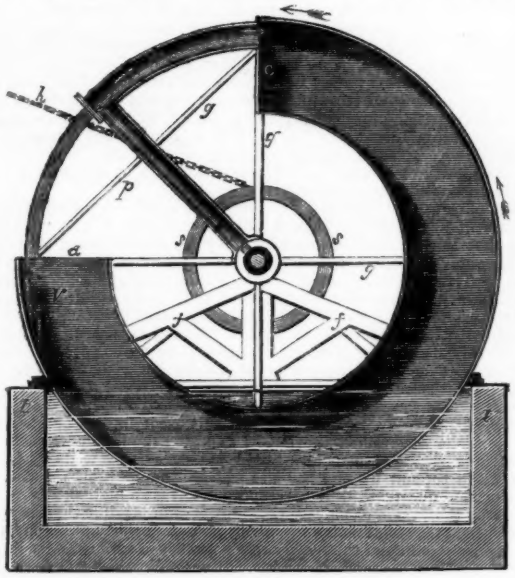


FIG. 1.

was fixed to the axle. The other part of the chain passed over a pulley, and to it were suspended counterbalance weights, for the purpose of keeping the holder in equilibrium in all its varied positions. This, however, as the writer was informed many years ago, by a gentleman who was in the service of the Chartered Company at the period, was in practice quite impossible, and was the main objection to the use of this system, leading probably to the invention of the collapsing holder. With our present knowledge of the use of the cycloid as a compensator, the machine could now be practically applied, and the difficulties then existing overcome, without, however, offering any advantage, as the apparatus would be quite unsuitable for the extensive requirements of modern times.

The action of the apparatus was as follows:—The holder being empty, was in such a position that the end, *c*, was just above the level of the water in the tank. In the first instance, a quantity of water was placed within the holder, to the height indicated in the drawing, and on the gas entering, it would press or force itself between the surface of the water and the end, *c*, of the holder (as in an ordinary gasholder), causing the vessel, *v*, to revolve on its axle in the direction of the arrows, until the part *a* would be well immersed in the tank, when the holder would be full. Then, by changing the valves, and communicating with the outlet-pipes, the holder, by its weight, would expel the gas, and revolve in the opposite direction to that indicated in the sketch, and thus be emptied.

The similarity between this instrument and the meter wheel must be palpable, and, as will hereafter be shown, the transition from this to the present meter was so gradual and positive as to leave no doubt about the correctness of our assertions concerning its origin.

Fig. 2 represents the elevation of one of the measuring chambers of a meter-wheel attached to its axle, which is in reality a gasholder in the form of the fourth part of a cylinder, that portion nearest the axle being occupied by water. It is very similar to Clegg's rotary holder, but with the advantage that, in being filled and emptied, it revolves always in the same direction. One of the partitions, *p*, is shown, the other being represented by dotted lines; the inlet and outlet passages, which are long narrow openings, shown in section in fig. 4, are indicated by the letters *i* and *o*. For the sake of illustration, we will suppose this vessel to be supported by suitable bearings, placed on a small tank, in which it can freely revolve, the

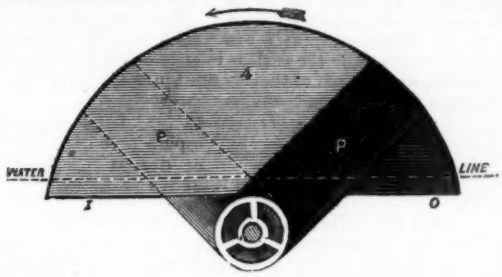


FIG. 2.

tank being filled with water to the line marked. As represented, both the inlet in front and the outlet at the back are sealed by the water, consequently neither gas nor air can enter therein nor pass therefrom. If now the vessel be slowly turned by the hand in the direction of the arrow, the outlet will become unsealed, and the gas or air will be gradually expelled and replaced by the water, and the vessel immersed. Continuing the operation, air will enter by the inlet, the vessel will gradually rise, and when attaining the position represented will be then filled. This is precisely the action which takes place with each chamber of the meter-wheel, of which there are four, attached to one common shaft, each chamber being provided with its corresponding inlet and outlet as described.

Fig. 3 is a drawing of a meter-wheel, either the front or back, showing the passages to the various compartments, but it is evident, if this were placed within the case without the means of separating

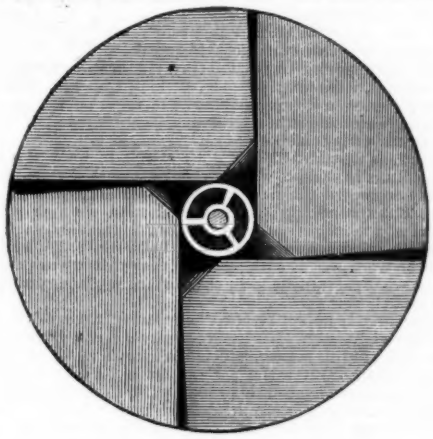


FIG. 3.

the inlet from the outlet passages, it would be inoperative. This separation is accomplished by a very simple means, known as the "hollow cover" and "spout," which were the invention of the very ingenious John Malam.

Fig. 4 represents the case of a station-meter in cross section, with a side view of the wheel, which revolves with the axle *a*; also showing the interior of one of the measuring chambers, the hollow cover, Q, in section, and the spout, *r*. The hollow cover is a concave

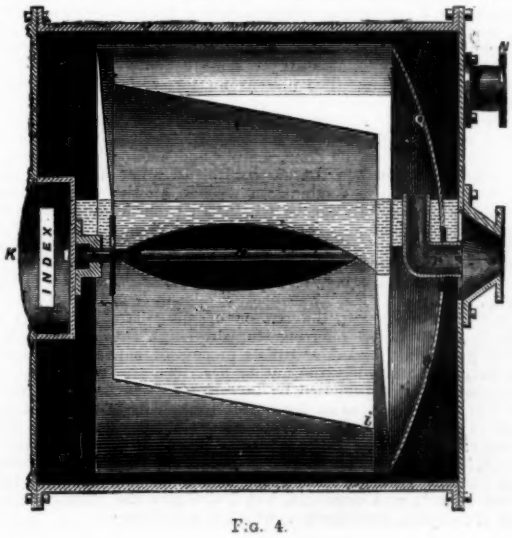


FIG. 4.

disc, soldered hermetically around its edges to the wheel, and has at its centre a circular orifice by which the spout is admitted. The spout is a bent pipe, securely attached to the outer case, but completely isolated from the wheel, and enters the hollow cover, its top extending a short distance above the water line. The openings in the centre of the wheel are for the purpose of allowing the water to flow freely into and out of the various chambers as the wheel revolves; these, as well as the orifice in the hollow cover, are sealed by the water, as shown in the drawing. Thus, the gas entering the meter in the direction of the arrow passes into the hollow cover, whence it is conveyed by the various inlet passages into the respective chambers, and as each of these is filled in rotation, so is the gas expelled from the preceding chamber.

(*To be continued.*)

Correspondence.

THE REVIVIFICATION OF GAS LIQUOR.

SIR,—The new "Treatise" on gas manufacture, which is appearing as a serial in your JOURNAL, promises to supply a great and long-existing desideratum. As is well known, there has never been any standard work on gas-making except that which bears the name of the late Mr. Clegg. In Mr. Clegg's time, the Chemistry of coal gas was merely in its infancy, while, as regards gas-*making*, many inventions and suggestions have recently been made, as regards both the apparatus and the processes, which are worthy of careful attention. Take, for example, the inventions devised for the purpose of *increasing the make of gas* from a given quantity of coal (which is really *the* question in gas manufacture), of which there have been many during the last three or four years, from the complicated process of Dr. Eveleigh down to, or up to, the simple process of Mr. Malam. The Eveleigh process proved a failure, as I believe most of the others will do; but I think there is a good deal to be learnt from a thoughtful examination and criticism of these processes, whereby what is really valuable in them (or at least in their object or purpose) may be attained simply by a more skilful mode of distilling the gas in the present retorts, and with hardly any departure from the ordinary system of gas-making.

As regards gas *purification*, the number of vague opinions and undetermined questions which came under my notice as a Gas Referee was most perplexing and disheartening. On some of these questions hardly even an *opinion* was to be found, and on most of the others the prevalent opinions (which too often were accepted and acted upon as *facts*) proved to be wholly unsupported by trustworthy testings or experiments, and, in not a few cases, were utterly wrong. I think I may fairly claim credit for the Gas Referees in determining some of those points, by sifting out the truth, and presenting it in a clear and easily intelligible form to the gas world in our various Reports.

Every one feels that Mr. Clegg's work stands in need of a successor. Successive editors have dealt with Mr. Clegg's treatise, and, undoubtedly, have greatly increased the amount of information which it originally contained. But the editing has proceeded upon a wrong principle, so that, instead of a homogeneous work (such as a standard work ought to be), it is merely a big book of "threads and patches." The editors failed to see that the work was so entirely out of date that it was past patching up, and that what is requisite is an entire recasting and remodelling, or, in fact, *an entirely new work*.

The author of the new "Treatise," appearing in your JOURNAL, goes to work in the right way. He has correctly discerned what is wanted by the gas world in this matter, and is fulfilling his task with great care and ability. I do not know the author, nor can I even conjecture who he is; but he seems to me to bring to his work as varied and complete a knowledge of the subject as can be desired, and, indeed, is producing a more valuable work than I thought any one at present was capable of writing.

I make these remarks upon the importance of this "Treatise," as promising to supply the long-felt want for a new standard work on gas, in the hope that gas managers and engineers, many of whom possess valuable and special knowledge upon important and intricate questions connected with their profession, may call attention to these matters in your JOURNAL, in order that these may be adequately dealt with in time to be included in this "Treatise" when it appears in a separate form as the standard work upon gas-making.

There are one or two questions of this kind which, with your permission, I should like to bring before your readers for discussion. One of these, which I discussed a fortnight ago, is the question whether the production of bisulphide of carbon in the retorts is due to "high heats," when I gave my reasons for discrediting this prevalent opinion, while expressing the great want of some conclusive experiments to determine the question. The present matter—viz., the revivification of gas liquor—is a subject second to none in importance in connexion with *economy in gas purification*. As fully described in my pamphlet on "Gas Purification," I am confident that the entire work of gas purification can be done, simply and efficiently, by means of the Ammonia contained in the gas itself. In other words, by means of one impurity, and in combination with it, all the other impurities (viz., CO_2, SH_2, and CS_2) can be eliminated from the gas, and without the use of Purifiers at all. This process can be carried out to a great extent simply by the gas liquor ordinarily produced; but, in order that the process may do the *entire* work of purification, a revivifying, or at least a decarbonating, of a portion of the gas liquor is indispensable.

In last week's JOURNAL the author of the "Treatise" dealt with this subject, specially referring to Dr. Leigh's process of decarbonating gas liquor, and Mr. Hills's process of entire revivification; and a fortnight previously the author described and commented upon an analogous process proposed by myself. This process of "revivification" is fully *described* in my patent (March 9, 1872), but it forms no part of the said patent—I make no "claim" whatever in regard to it—merely describing it as a useful auxiliary to the adoption of the *purifying processes* by means of soda and ammonia which I include in that patent. In most cases I only require to *decarbonate* the fouled solutions of soda and ammonia, but I also give the above-mentioned process of complete revivification, which is as follows:—

Chalk (carbonate of lime) is burned in a retort or otherwise, and the carbonic acid evolved from it is conducted into the tank containing the fouled liquor, whereby the sulphur is expelled from the liquor by the carbonic acid, and is then passed into a vessel containing oxide of iron, where the sulphur is arrested and obtained in a commercial form. Thereafter the caustic lime remaining in the retort (or rather more than that quantity) is thrown into the liquor in the tank, and is stirred about until the solution becomes caustic; whereupon the lime, being allowed to settle, sinks to the bottom in the form of carbonate of lime, which may be burned over again in the retort, while the revivified liquor is drawn off to be used again in the washers or scrubbers. This process, I remarked, may be greatly improved and accelerated "by *heating the liquor in the tank by means of steam*—in which case, also, no stirring of the liquor is necessary."

This process of revivification is more complete than Dr. Leigh's, as regards the *production* (from chalk) and *re-use* of the lime, and also in saving the sulphur, by obtaining that material from the fouled solutions in a commercial form. In this particular instance the saving of the sulphur may be a very small matter; but, as regards the *principle*, I am convinced that the saving of every particle of waste materials will ere long be held to be as important a matter in gas purification as in the other branches of manufacturing industry.

But, while suggesting this process of revivification, I am very far from being satisfied with it. The author of the "Treatise" on gas manufacture, commenting on my process (Jan. 19), says, "Whether it will be successful in a commercial sense is at present somewhat of an open question, although, from its apparent simplicity, there is a strong presumption in its favour." It certainly appears to me (though doubtless I am not an impartial judge in this matter) to be more satisfactory than Dr. Leigh's, and I think it possible that it might prove less expensive than the scientifically perfect process of Mr. Hills; at the same time I must say that, having no experience of the cost or practical working of Mr. Hills's or any other of the above-mentioned processes (my own included), I am not in a position to offer an opinion on the subject.

But, sir, the prime point for consideration (and for the sake of which I thus venture to occupy your space) is, not the comparative value of the above-mentioned processes, but whether each and all of them may not be superseded by some cheaper method. The object to be attained is by far the most important, as regards *economy*, of all the questions which remain unsolved in gas purification. I repeat, and indeed have shown, that the entire purification of gas may be effected in washers or scrubbers (which are much more cheaply worked than purifiers) by means of the ammonia obtained from the gas itself; and a great reward will be justly due to any one who facilitates this important improvement by devising a cheap method of revivifying fouled gas liquor. Mr. Hills is so experienced in such matters that I naturally look to him to do this, but it must be by something less costly than he has yet proposed. It may be that this is impossible, but so important an object ought not to be abandoned without a further trial to accomplish it.

I may observe that after describing my process of *decarbonating* fouled solutions of soda and ammonia, I added (pamphlet, p. 24), "I am in hopes that the fouled soda solution may be decarbonated *merely by passing hot air through it*, which would be a costless process of revivification." The soda solution, of course, is not volatile like the ammonia in gas liquor. On the other hand, as I shall show, gas liquor has an advantage as regards capacity for revivification, which, hitherto, has not been sufficiently considered. It is also the fact, as regards gas liquor, that Mr. Livesey mentioned to me, a day or two ago, that simply by heating it he had been able to obtain "a rough caustic ammonia," thereby showing that by this simple method he had been able to revivify the liquor to a considerable extent. I do not know whether Mr. Livesey is following up this experiment, or whether, by analysis, he ascertained the extent to which the liquor was actually revivified or rendered caustic. But I am sure it is well worth his while to do so, and no one is more capable than himself to work out this important question. Mr. Livesey told me that a high authority had said to him that, upon chemical principles, it is impossible that he could have obtained the result which he affirms he did. Probably this chemical opinion was based upon the remarkable volatility of ammonia, leading to the inference that the ammonia would be driven off by the heat before, or at least along with, the saturating acid impurities, CO_2 and SH_2. But against this theoretic judgment must be placed the remarkable affinity of ammonia for water, which is many hundred times greater than the affinity of the saturating acids in fouled gas liquor. In fact, water can only absorb $2\frac{1}{2}$ times its volume of SH_2 and only one volume of CO_2, whereas it can absorb nearly 780 times its own bulk of ammonia gas. In other words, the relative affinity of these substances for water stands thus: $CO_2 = 1$, $SH_2 = 2\frac{1}{2}$, $NH_3 = 780$! These facts, I think, may supply the true explanation of the generally unexpected result obtained by Mr. Livesey; and it seems to me that this remarkable superiority in affinity for water which ammonia has, compared with carbonic acid and sulphuretted hydrogen, supplies a good ground for hope that the revivification of gas liquor may yet be effected by very simple and almost costless means. I sincerely trust that Mr. Livesey will continue his experiments; for, if gas liquor can be revivified to such an extent as will make it practically of use again, merely by passing hot air through it, an inestimable service would thus be rendered to the economy of gas purification. At least it is worthy of trial.

R. H. PATTERSON.

21, *John Street, Adelphi.*

METER-INDEXES.

SIR,—In reply to "A Country Manager," I would advise him to do, as I have always had done, and as he will find all sensible ledger-keepers would do—viz., to drop the extra figure, after the account is made up for the quarter in which the revolution occurs—that is, if the index records 98,600 cubic feet one quarter and 1200 the following quarter (the meter being a three-dial one), enter it on the account and in the ledger as 101,200; this will show that the index has made a revolution, and that the meter is not a new one. Next quarter, if the index is 3900, *enter it* as 3900, and 1200 as the last index, showing the consumption to be 2700, which would be the actual index and the correct consumption. To continue the extra figures beyond the first quarter is not only perfectly useless, but absolutely a disgraceful waste of time in recording the indexes on the accounts and in the books of the company, if carried on to any great extent.

MAGNUS OHREN.

Lower Sydenham, S.E., Feb. 4, 1875.

Sir,—Noticing in your Journal a letter from "A Country Manager," asking as to meter indexes, I infer from the question that, like myself, the writer finds his difficulties in England, as meters here are in many cases required to register a much larger quantity of gas, in proportion to their size, than in Scotland.

In taking possession of my survey books here, I found the indexes carried on to such an extent that it was difficult to recognize a meter by its former index, especially in cases of two-light meters, where a quarter's consumption was over 10,000 cubic feet, and it was only by reference to a former quarter's consumption that the account could be made up; and even then I could not tell whether the meter was registering or not, unless by again taking the index after a week's burning, when, in more than one case, I found, instead of the meter having registered a few thousands, it had only gone a few hundreds, and stopped.

From the above it is my opinion that small meters should be avoided; in fact, a two-light never fixed, unless to a lamp, whereby all such supposed figures would be unnecessary; and the nearer a meter is worked up to its capacity, the more correct is its register, as by working at a fast rate gas is lost to the company, especially where the water-line is not kept up properly.

I would therefore advise the writer to discard, as I have done, all figures not actually shown on the index, as in time confusion will follow; though in some cases it is necessary and advisable to give the consumers such figures, so that they may better understand (which I am sorry so few do, or even try to do, but steadfastly affirm that a gas-meter is a dark mystery made for the gas company and not for them.) This, however, can be easily done without carrying on index in company's books.

The only advantage I can see in carrying on figures is that it shows at a glance how much work has really been performed since the meter was fixed. But this can be got, if required, by a little extra trouble, and I think the confusing figures, as they must be when so high as those the writer cites—viz., 2,302,200—overbalance the extra work.

As a cure, I would further advise the writer to fix all meters larger than what is at first really required, as, in nine cases out of ten, extra lights are added after the meter is fixed.

T. D. H.

Feb. 5, 1875. (A Country Manager in England).

Sir,—In reply to the inquiries of "A Country Manager," the usual method adopted by meter inspectors and gas companies book-keepers, under the circumstances mentioned by him, is to discontinue the higher denomination after being once recorded. Thus, as he states, a 3-light meter standing in October at 98,600, and in January at 1200, would be returned by the inspector and entered in the ledger as 101,200. But, in all subsequent accounts, the higher figures are dropped; so, supposing the consumption the following quarter to be 3000, the index returned and entered would be 4200.

According to the average consumption, it would require five or six years for the hand of the 100,000 dial to make a revolution. It can, therefore, serve no useful purpose to retain the higher figures.

Feb. 6, 1875. Nemo.

FROZEN GAS-METERS.

Sir,—Your correspondents on frozen gas-meters treat the subject very ably; but I have found that the evils complained of with reference to dry meters are frequently caused by defective fixing. Dry meters are often placed below the level of lights, and the outlet-pipe to fittings brought straight down into the meter, thus affording every facility for the passage of damp into the meter. After a time the condensation becomes a thick gummy matter, sticking about the internal parts of the meter, and by any sudden change in our variable temperature (either heat or frost) it becomes stiff, causing groaning, jumping, and sometimes sudden extinction of lights, which is of so much annoyance both to consumer and manager.

In a great measure to obviate this difficulty, the outlet-pipe should be brought to near the bottom of the meter (and a tap inserted if thought necessary), and a piece of metal pipe connected to that and bent over to the outlet, and therefore condensation, if any, would pass into the spare piece of pipe.

I believe this is the system invariably adopted in many works, but that it is not the case in all, I have reason to know.

Berkhamstead, Jan. 30, 1875. H. A. Anderson.

PURIFIERS AT THE ALLOA GAS-WORKS.

Sir,—In reference to your remarks on the annual report of the West of Scotland Gas Managers Association, regarding Alloa, allow me to say that there are four purifiers, 9 feet by 9 feet, three trays in each, with a depth of 6 inches of lime on each tray. Three purifiers are always at work, the fourth being idle for cleaning, or ready to be turned on when the third becomes foul. The correction will read thus:—The three purifiers at work contain 320 superficial feet of area, nine trays, with a depth of 6 inches of lime each, equal to 54 inches depth of lime. I had only returned the area and number of trays in each purifier, with the depth of lime on each tray.

I hope the above will fully explain the statement in the return I sent in.

George Boyd.

Gas Company's Office, Alloa, Feb. 4, 1875.

Galashiels Water Supply.—A company was formed some time ago, for the purpose of supplying the town with water from the Luggate. The company prepared plans, and took all the steps necessary to go to Parliament. The Town Council, as local authority, are opposed to this company obtaining a private bill, and desire to have the introduction of water in their own hands; but in the opinion of high legal advisers, the local autority have no powers to assess the ratepayers for funds to conduct a parliamentary opposition to the water company's bill. In this dilemma, Provost Laidlaw, without the concurrence of the local authority, offered to give his own personal guarantee to the water company for the repayment of the company's actual outlay, if their bill was withdrawn. A meeting of shareholders and directors of the water company was held on the 1st inst., to consider the propriety of accepting the provost's offer, and withdrawing the bill. It was moved that the bill be withdrawn, and an amendment was proposed that the meeting be adjourned for a fortnight, and a committee appointed to correspond with the local authority, and ascertain whether the company's bill would be taken over by the local authority, on the payment of expenses, and the bill further prosecuted in Parliament. The amendment was carried, and a committee appointed in its terms.

Parliamentary Intelligence.

GAS AND WATER BILLS, 1875.

Monday, Feb. 1.

The following unopposed petitions for bills passed Standing Orders:—
Inverness Water and Gas Supply (Purchase of Existing Works, &c.).
Widnes Local Board.
Ashton-under-Lyne, Stalybridge, and Dukinfield District Water-Works.

In the case of the Chelsea Water-Works (unopposed), the Standing Orders were not complied with.

The Southampton Corporation Gas (New Works, &c.) Bill was struck out, no appearance in support being recorded.

Tuesday, Feb. 2.

The following unopposed petitions for bills passed Standing Orders:—

Worksop Water.	Slough Water.
Maidenhead Water.	Pontefract Borough Extension.
Carmarthen Gas.	Stafford Water.

The opposed case of the Phœnix Gaslight and Coke Company was heard, but the examiner reserved his decision until Feb 3.

Wednesday, Feb. 3.

In the opposed case of the Phœnix Gaslight and Coke Company, the memorial was not sustained, and the petition was accordingly endorsed by the examiner for due compliance.

Thursday, Feb. 4.

The following unopposed petitions for bills passed Standing Orders:—
Heckmondwike Gas.
Birmingham (Corporation) Water.
Birmingham (Corporation) Gas.

HOUSE OF COMMONS.

Friday, Feb. 5.

Copies were presented of reports by the Board of Trade of their proceedings under the Gas and Water Facilities Act, 1870, during the sessions of 1873 and 1874.

Mr. Freshfield gave notice that on Tuesday, Feb. 9, he will ask the chairman of the Metropolitan Board of Works whether his attention has been directed to the danger and inconvenience resulting (in case of fire) from the want of hydrants in the thoroughfares of the metropolis.

Sir William Fraser gave notice that on Tuesday, Feb. 9, he will move—"That, in the opinion of this House, the condition of the metropolis as regards lighting, paving, and cleansing calls for legislation."

Mr. Sclater-Booth gave notice that on Thursday, Feb. 11, he will move for leave to bring in a bill for consolidating and amending the Acts relating to public health in England.

Colonel Beresford gave notice that on Friday, March 5, he will move for leave to bring in a bill for improving the supply of water to the metropolis.

Legal Intelligence.

RECORDER'S COURT, DUBLIN.—Saturday, Jan. 30.

(*Before the* Recorder.)

Wilson *v.* the Alliance and Consumers Gas Company.

In this case the plaintiff, Mr. J. Wilson, Capel Street, summoned the company to recover the sum of £3, which he alleged was an overcharge in his account for a half year's supply.

Mr. Fitzgerald appeared for the plaintiff, and Mr. Bloomfield for defendant.

Mr. *Chlinchy*, book-keeper to the plaintiff, stated that he had calculated the number of hours the gas was burned, and he arrived at the conclusion that the meter was 50 per cent. wrong. Mr. Wilson stated that he had 30 lights in use, and he knew of no reason for his bill increasing.

Mr. *Thomas Cotton* stated, in defence, that the company were anxious that the question should be fairly gone into, as they would prove that the gas was accurately measured. The meter had been stamped in compliance with the Act of Parliament, both before it was fixed and subsequently, when the account was disputed. Mr. Wilson took the corresponding account of the previous year as the average, but that was an unfair comparison, inasmuch as there was a sudden diminution in the consumption of gas during that period. Previously there had been a consumption of gas much in excess of the amounts in dispute. He had put up additional lights, and increased his consumption, and the company had for some time past materially improved the supply to meet growing demands from the public.

The Recorder decided that Mr. Chlinchy's calculation was only an assumption. The meter was tested and found correct, besides it was clear that previous accounts, over which there was no dispute, were in excess of the present one. He therefore dismissed the case.

THAMES POLICE COURT.—Tuesday, Feb. 2.

(*Before Mr.* Lushington.)

Wilson *v.* the Gaslight and Coke Company.

The complainant in this case is the surveyor of the parish of St. George-in-the-East, and he sued the company in that capacity, under section 109 of the Metropolis Local Management Act, 1855, for having, on the 19th ult., "unlawfully broken up the surface of the Commercial Road, of which the paving is under the control of the vestry of St. George, without giving three clear days notice to such vestry, it not being a case of emergency."

The facts, which unfortunately were not gone into, are these:—The East London Railway Company having constructed a railway beneath the London Docks, are extending their line northwards towards Whitechapel, and, in the progress of their work, have now arrived at the Commercial Road, beneath the surface of which their tunnel passes at a depth of upwards of 40 feet. Two feet below the surface of the road lies the huge trunk main of The Gaslight and Coke Company, 48 inches in diameter, which conveys the gas from the Beckton works. The chief inspector of the company (Mr. Johnson) finding, about the middle of last month, that the effect of the tunnelling for the railway had been to cause an evident sinking of the surface of the road, and a disturbance of the line of trams along it, prudently took prompt measures for the safety of the gas-main, and it was for the alleged breach of the Act, which requires notice to the local authority, this being, as stated in the information, "not a case of emergency," that the company were summoned.

Mr *George Wilson*, the complainant, said: On the 19th of January last the Gaslight and Coke Company tore up the pavements in the Commercial Road, and erected a hoarding, without giving proper notice to the vestry, they being the authority having control over the road.

The Clerk: And you say it was not a case of emergency?

Complainant: No; and even in that case they should have given me notice within twelve hours.

Mr. Harmsworth (who appeared for the company, instructed by Messrs. Humphreys and Morgan): How do you propose to show, first of all, that the Commercial Road is in the parish of St. George?

Complainant: I say it is under the control of the vestry.

Mr. HARMSWORTH: How do you propose to show that?

Complainant: There is an agreement between them and the parish of Mile End Old Town.

Mr. LUSHINGTON: Where do you say the place is?

Complainant: In the Commercial Road, opposite Watney Street.

Mr. LUSHINGTON: In what parish?

Complainant: In the parish of Mile End Old Town; but there is an arrangement that we should have the whole control of the road for 50 feet to the east of Watney Street.

Mr. LUSHINGTON: Is that an arrangement in writing?

Complainant: Yes. I have not got it here.

Mr. HARMSWORTH: This being a penal statute, I shall require strict proof of the fact, and I shall require you also to show that this was not a case of emergency.

Complainant: If it was a case of emergency, they are bound to give notice within twelve hours after they began to break up the pavement.

Mr. HARMSWORTH: To whom?

Complainant: To the authority having the control of the road.

Mr. LUSHINGTON: You come here relying upon an arrangement of which you have not a copy.

Complainant: Mr. Knight, surveyor, of Mile End, has a copy of it, and I think he would produce it.

Mr. HARMSWORTH: Mr. Knight is here to prove that he had notice.

Mr. LUSHINGTON: As a matter of fact, what control does the St. George's vestry exercise?

Complainant: We do all the paving work.

Mr. LUSHINGTON: Do you say that of your own knowledge?

Complainant: Yes; I do it.

Mr. LUSHINGTON: What are you?

Complainant: Surveyor of the parish. I have been surveyor 2½ years, and the arrangement existed before that.

Mr. LUSHINGTON: But you have no document here showing the nature of the arrangement.

Complainant: No.

Mr. LUSHINGTON: You say you do the paving. How do you pave it; according to the views of the vestry of St. George or of Mile End?

Complainant: St. George's Vestry, certainly.

Mr. LUSHINGTON: You mean that, if they choose to have it paved with wood or asphalte, it could be done without any communication with the Mile End board?

Complainant: Yes.

Mr. LUSHINGTON: You have entire control of it in the vestry of St. George?

Complainant: Yes.

Mr. HARMSWORTH: I submit that this gentleman must show absolutely that this road is in the parish of St. George.

Complainant: I do not say that. I say it is under the control of the vestry.

Mr. HARMSWORTH: Then you must show by something better than a mere statement that the paving of the road is under their control.

Mr. LUSHINGTON: The words of the section (109) are—"No company or person shall break up or open the pavement surface or soil of any street the paving whereof is under the control and management of the vestry or district board of any parish or district." That is what the Act says. But what the complainant says is, that he has been surveyor of St. George's for the last two years and a half, and during the whole of that time this portion of the road has been repaired and managed by his vestry, and that they have the right to pave it in what way they please.

Mr. HARMSWORTH: I think we ought to have strict proof of the fact, this being a penal statute. They must show that the road is under their complete control, and not that some private arrangement exists between them and a neighbouring parish which cannot affect us. I am quite prepared to admit that there may be such an arrangement, but it must be an arrangement based upon parliamentary sanction such as would affect the public, with notice of its existence, before such a complaint as is now made can be substantiated. No doubt some parishes do, for convenience, have private arrangements amongst themselves with reference to paving, cleansing, and watering, but there must be something more than that shown in a case like this—there must be an absolute control and management derived from parliamentary powers so as to affect the public, with notice of such control. Because the case I shall put before the bench is that The Gaslight and Coke Company did give proper notice to Mr. Knight, the surveyor of the parish of Mile End Old Town. Mr. Wilson admits that Mr. Knight is the proper person, as far as the public are concerned, to whom notice should be given, and Mr. Knight is here to prove that he did receive the proper notice. Can it be said that the defendants are to be punished for an offence created by Act of Parliament, in the absence of complaint, by the proper authorities, whose legal control cannot be affected by any private arrangements they may make with another parish? (To complainant:) Do you produce a plan of the boundaries?

Complainant: No.

Mr. HARMSWORTH: But you admit that this road is beyond your parish?

Complainant: Yes; but under our control, by an arrangement sanctioned by the Metropolitan Board of Works.

Mr. HARMSWORTH: The language of the clause is very explicit. It says, "The paving whereof is under the control and management of the vestry or district board." These districts are all defined by the Act, and the Legislature did not contemplate the entering by parishes into arrangements for purposes of their own convenience in reference to paving, lighting, and cleansing. This is a kind of union or partnership of parishes for the purpose of doing certain work, but the statutory control is still with the Mile End district.

Mr. LUSHINGTON: I see the 96th clause says: "Every vestry and district board shall, within their parish or district (exclusively of any other person whatsoever), execute the office of and be surveyor of highways, and have all such powers, authorities, and duties as any surveyor of highways in England is now or may hereafter be invested; and all streets, being highways, and the pavements, stones, and other materials thereof, and all other things provided for the purposes thereof by any surveyor of highways, or by any person serving the office of surveyor of highways, or by any vestry or district board under this Act, shall vest in, and be under, the management and control of the vestry or district board of the parish or district in which such highways are situate." Then the 98th section says: "It shall be lawful for every vestry and district board from time to time to cause all or any of the streets within their parish or district, or any part thereof respectively, to be paved or repaired," &c. In connexion with this, I must read the 109th section, under which the summons was taken out. My first impression was that the mere fact of the paving being done by the one vestry out of its district would give the control, but after reading these sections, I think it is quite clear that the "control and management" of the highways still remain in the parish in which they are situate, and must so remain, notwithstanding any private arrangements between the vestries with reference to paving the same. This summons is, therefore, not properly taken out, and must be dismissed.

Mr. HARMSWORTH: The company would not have defended this case, but that the facts are very important. Owing to a subsidence of the ground by the removal of the lateral supports in the cutting made by the railway company, there was a severe pressure upon a very large main, the consequence of a fracture in which would have been very serious, and I should have submitted that, even had notice not been given, it was such a case of emergency, with regard to the protection of life and property, that the company would have been justified in breaking up the road.

Mr. LUSHINGTON: I know the spot very well, having to pass over it every day, and I have no doubt this is a very correct statement of the facts, as far as the gas-main is concerned.

Mr. HARMSWORTH: I have to ask for costs.

Mr. LUSHINGTON: I do not think it is a case for costs.

SHEFFIELD POLICE COURT.—THURSDAY, FEB. 4.

(Before Mr. WELBY.)

DISCHARGE OF A WORKMAN FOR VIOLATION OF THE RULES OF THE GAS COMPANY.

The Sheffield United Gas Company were summoned by Wm. Taylor, gas-fitter, late in their employ, for 22s. in lieu of a week's notice.

The complainant had been to a house in Highfield to do some repairs. There was no meter in the house, and the householder requested him to connect a pipe to the main, so that he might not be in darkness. Complainant at first demurred, knowing that it was against the rules of the company, but being pressed by the proprietor of the house, who promised to pay any demands the company might make, he did as he was requested, and the matter coming to the ears of Mr. Roberts, he was summarily discharged. Complainant now claimed a week's wages.

Mr. *Roberts*, the company's manager, said that the complainant had broken a most important rule, and therefore was not entitled either to notice or a week's wages. He could not condone such an offence if he would.

The *Complainant* stated that Mr. Roberts suspended him until he saw him again, and he went to that gentleman's office day after day, but only received a definite notice from Mr. Anthony, a sub-manager, the Thursday following.

Mr. *Roberts* said that he had only suspended the complainant until a full investigation had been made. Pending that information, he was confined to his house by illness, and did not get to the office until the following Thursday. On that day he instructed Mr. Anthony to discharge him.

Mr. WELBY said it appeared that the company had acted strictly on their rights, and therefore they ought strictly to act up to their duties. They had not done so in prolonging the investigation seven days, during which complainant was suspended. That being so, he should allow him 10s. compensation for that delay, and the costs.

REDUCTIONS IN THE PRICE OF GAS.—The directors of the Horsham Gas Company have reduced the price of gas to their consumers from 5s. 10d. to 5s., as from the beginning of January last. The Bodmin Consumers Company announce a reduction from 6s. 6d. to 6s. 3d., with 6d. per 1000 cubic feet discount for payment within one month of the quarter. At Frodsham the price has been reduced from 6s. 8d. to 5s. 10d.

PUBLIC LIGHTING AT RYDE.— At the meeting of the Ryde Town Council on the 29th ult.—the mayor (Alderman Barrow) presiding—Alderman Dashwood moved that a notice be issued inviting tenders from persons willing to undertake the whole of the work in reference to the lighting, regulating, extinguishing, painting, cleaning, and repairing the gas columns and lanterns, the contractor to name the sum for which he would undertake the duties for one year. The present arrangements for lighting, extinguishing, &c., were not so satisfactory as they might be, and were very much more expensive than they ought to be. It was a question to consider whether the increased expense was not a great deal more after the rate of improvement in the lighting than it ought to be. Instead of 5 feet or 6 feet an hour, 9 feet and 10 feet were burned in many lamps. They must have some one responsible for proper regulation. Different persons now lighted, and they could not fix the responsibility for anything which went wrong, on any one. It would be better and cheaper to engage one man, and let him employ others. He believed the meters would involve them in a deal of expense, but the contractor would not have anything to do with them. The police now extinguished, but the work was done most irregularly, according to the discretion of the men, who differed in opinion as to the time lamps should be put out; sometimes the town was in darkness after eleven, and sometimes only partly lighted. Even if this system was satisfactory, he questioned whether they were justified in so employing the police. If any troublesome person chose to lay information, they might have a difficulty in getting the Government grant. Mr. Barton seconded. Mr. Smith said the town was never better lighted, and there were no complaints. It was said that a little wind was pumped up the pipes sometimes. They ought to test the gas, and know what they were paying for. Mr. White said that before they made any alteration they should inquire of the Secretary of State whether policemen might perform such duties; if not, it was time the law was altered. It came under the head of "Lighting and Watching." He moved as an amendment that as the cost of police in boroughs was now heavy, it was desirable that they be allowed to perform certain local duties; and as they were the best judges whether lights were required or not, and could extinguish them without interference with their ordinary duties, it was desirable that an inquiry should be made of the Secretary of State whether the performance of such duty would do allowed. Every corporation ought to make a representation as to the increasing cost of the police, and urge that they be allowed to perform all public duties under the Sanitary Acts. Figures ought to have been given, showing the difference in the cost of the two systems and the increased benefits. The lights were better now than formerly, but often the lamps were not lighted at all, and he was surprised to hear of an increase. He should ever be of opinion that it would have been better for the town if it had purchased the gas-works, not at the price, but at a fair one. Mr. Smith seconded the amendment. Mr. Gunn also asked for comparative figures. No doubt the present light was an expensive one, for a lot of gas seemed to be forcing out of the burners very irregularly; the lamps should be so regulated that no more gas passed through the burners than was consumed. He deprecated insinuations as to wind, and said the gas company were as honourable as any other men. He understood that one man was occupied four days a week in attending to the meters, which was expensive. They should have a skilled man to see to them; a labourer could light, &c. Mr. Wallis held that painting and glazing should be omitted from the contract. Master plumbers would contract for that, but not the rest. He held that policemen being employed to extinguish lamps gave burglars a clear course, as they had only to watch the lamps go out to know where the police were. Mr. Futcher objected to the suggested omission. The present man, did glazing, &c., in his spare time. Alderman Harrington said an inspector's opinion was that it was illegal to so employ the police. Alderman Dashwood said that when the contract with the gas company was annulled, the cost of columns and everything included was about £800 a year; at the present rate at which gas was burned the total would be about £1600. It might and ought to be done for £1300; it could not be for less. The town was often in darkness before midnight; it was a temptation to crime, and one case as the result had come before the magistrates, a boy being sent to Winchester for stealing from a van. Police duties could not, or ought not, to include such duties as extinguishing lamps. The cost of the police had decreased, Government now allowing 50s. instead of 25s. It was desirable that no one should touch the meters, so that it should not be said there had been any tampering with them. If five men were necessary, the contractor would have to get them. Now lamps at Swanmore were burning 7 feet or 8 feet an hour, half an hour before sunset, and must be lighted then, or lighting could not be completed by an hour after sunset. The amendement was put and negatived, and the original motion adopted.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

Metropolitan Board of Works.

The Usual Weekly Meeting of the Board was held on Friday last—Sir J. Hogg, M.P., in the chair.

The Parliamentary Committee presented the following report on

THE BILL FOR THE REGULATION OF THE METROPOLITAN GAS COMPANIES.

Your committee have to report that, acting upon the reference made to them on the 15th ult., they have considered what should be the provisions of the third bill to be introduced by the Corporation of London and the board relative to the metropolitan gas supply—viz., that for the better regulation of the companies, and have conferred with a sub-committee of the corporation on the subject.

The first point which naturally occurs to any one looking into the provisions of the existing Metropolitan Gas Acts, is the great diversity of the conditions to which the companies are subject. For instance, six of the nine companies known as metropolitan are still regulated by the Metropolis Gas Act of 1860, which only requires them to supply gas of 12-candle power, for which they may charge as high as 4s. 6d. per 1000 feet without interference. Of the other three companies, The Gaslight and Coke Company is required to supply gas of 16-candle power, and to charge only 3s. 9d. per 1000 feet; while the Imperial and the South Metropolitan Companies, which are regulated by Acts passed in 1869, are required to supply gas of 14-candle power, the price of the former being limited to 3s. 9d., and that of the latter to 3s. 6d. per 1000 feet. The prices of the last-mentioned three companies are, however, as is well known, subject to increase or reduction by the Board of Trade Commissioners. The three gas companies under the Acts of 1868 and 1869 are, it will be seen, required to give gas of a higher quality than the companies which remain under the Act of 1860, while the prices which they are authorized by their Acts to charge (when not specially increased by the commissioners) are much more favourable to the consumers. These three companies together supply, probably, more than two-thirds of the gas consumed in the metropolis, their working capital (share and loan), which may be taken as a tolerably fair indication of the extent of their supply, being £7,184,694, while the working capital of the six companies which remain under the Act of 1860 is £2,979,179. Further diversity is to be noticed in the rates of dividend which the companies are authorized to pay. By far the greater portion of the share capital is entitled to a dividend of 10 per cent., but in some cases it is 7½ per cent., or even less, and the share capital created by the Imperial Company, under its Act of 1869, is limited to a dividend of 7 per cent., the illuminating power of that company's gas having been at the same time fixed at 14 candles. There are also differences in the provisions of the various Acts as to reserve-funds, insurance-funds, contingency-funds, and other matters, and all these differences together make a general comparative view of the relative positions and circumstances of the companies very difficult.

It appears to your committee desirable that the conditions upon which the various companies in the metropolis are required to supply gas should be, as far as possible, uniform, that the gas should be of one quality, and that there should not any longer be such great inequalities of price as are to be found, for instance, in the adjoining districts of the Phœnix and the South Metropolitan Companies, where the customers of the former had, during part of last year, to pay 4s. 6d., and are now paying 4s. 2d. per 1000 feet, with a charge for the use of meters, whilst the customers of the latter have for two or three years past been paying but 3s. per 1000 feet without any charge for meters.

The most important points to be considered are, of course, the price and illuminating power of the gas, intimately connected with the first of which is the rate of dividend which the companies shall be authorized to pay to their shareholders. Upon these and other points your committee, after careful consideration, and consultation with a committee of the corporation, have agreed to the following suggestions, which they think will serve as a sufficient basis for the preparation of the bill, and they recommend that the bill be drawn in accordance therewith, your committee, of course, having power to make such modifications in detail as may be found expedient:—

1. That the conditions to be applied to all the gas companies should, as far as possible, be uniform.

2. That the standard illuminating power of the gas supplied by them should be 16 candles.

3. That the standard price should be 3s. 9d. per 1000 cubic feet.

4. That the maximum rate of dividend should be, as now, 10 per cent.

5. That any increase of the price above 3s. 9d. per 1000 feet should be accompanied by a corresponding fall in the rate of dividend, every penny per 1000 feet increase in the price to involve a diminution of one-quarter per cent. in the dividend; provided that in no case should any company charge a price which would enable it to pay a higher dividend than 10 per cent.

6. That no amalgamation between companies should take place without the consent of the board, and also, where the City is concerned, of the corporation.

7. That three referees should be appointed to discharge the same functions as now; but that one should be appointed by the corporation, one by this board, and one by the Board of Trade.

8. That the testing clauses of the Gas Act of 1868 should be so altered that the gas should at no period during the 24 hours be allowed to fall below the standard of 16 candles; and that the gas should be tested in the district where it is to be consumed.

9. That the test-burner should be the one prescribed by the present gas referees and now in use—viz., that known as Sugg's "London" Argand; that it should receive the sanction of Parliament; that a pattern of it should be certified by the Secretary of State, and be deposited with the Warden of the Standards; and that the burner should not be altered without the sanction of Parliament.

10. That all new capital henceforth to be raised be by debenture stock, bearing interest of not more than 5 per cent. per annum, or if by share capital, entitled to 10 per cent. dividend, such share capital to be put up to public tender and allotted to the highest bidders.

11. That loan capital henceforth converted into shares or ordinary capital should not be entitled to dividend at a higher rate than 5 per cent.

12. That power should be given to the corporation and the board to appear before the auditor of the companies accounts, with a power of appeal similar to that now possessed by the companies, and that the corporation and the board should have access to the companies books and documents.

13. That with reference to the insurance-fund, to meet any extraordinary claim or demand which may at any time arise against the companies from accident, which due prudence and management could not have prevented, the auditor should be the judge whether such due prudence and management have been exercised, his decision being subject to appeal by the companies, the corporation, and the board.

14. That in case of a dispute with the auditor, he should be authorized to allow, and fix the amount of, an *interim* dividend, pending the settlement of the dispute.

15. That any loss caused by defalcation on the part of any servant of a company should be directly borne by the shareholders in the shape of a diminution of dividend.

16. That the auditor should have the right of making a continuous audit during the half year.

17. That, in the event of any reference to arbitration, the arbitrator should determine the question of the payment of the costs of such arbitration.

Mr. Newton, in moving the adoption of the report, said it would be in the remembrance of the board that some time ago the committee proposed, and the board adopted their suggestion, that three bills in reference to the supply of gas to the metropolis should be promoted in the next session of Parliament. They were then informed that it was necessary that two of those should be immediately agreed to, and deposited at an early period, so as to comply with the Standing Orders of Parliament. With regard to the third bill, they were given to understand that it could be introduced at any period of the session. In agreeing to two of the bills, the board did not make any provision as to the terms that would be required if the supply of gas was to remain in the hands of the existing companies. It would be remembered that by the two bills he had referred to, one was for the purpose of enabling the board to erect new works and to lay down mains for the supply of the whole of the metropolis, and the other was for the purchase of the works of the existing gas companies. The subject was one upon which a strong feeling was entertained all over the metropolis last year, in consequence of the increase in the price of gas by the different companies, and it led to great excitement throughout the whole of the metropolitan area, and the board were advised to take some steps to protect the consumers from this intolerable burden. At that time the board were of opinion that this complaint on the part of the consumers could only be met by the board taking the supply of gas into their own hands, in conjunction with the Corporation of London, and they determined to go to Parliament for the purpose of creating an independent supply. The matter was referred to the Works Committee, who brought up a report recommending that the board should promote three alternative schemes in the present session, the first having for its object the purchase of the undertakings of the existing gas companies, the second for the erection of new and competing works, and the third to enforce uniform regulations upon the several companies. By the passing of one or other of these bills, they hoped to place the supply of gas to the metropolis upon a more satisfactory basis. The first of the three bills referred to proposed, as he said, that the board should erect new works, and provide an entirely independent supply of gas for the whole of the metropolis. That proposition, it would be remembered, was very strongly entertained by the whole of the consumers in the early part of last year. There was no doubt that the high prices charged by the Imperial and Chartered Gas Companies led to a very great deal of excitement throughout the metropolis, and strong pressure was put upon this board by the various vestries and district boards, and consumers, to take some steps to relieve them of such unfair burdens. The board then considered that the best manner in which the matter could be treated was to take the supply of gas out of the hands of private manufacturers, and place it in the hands of the Corporation of London and of this board. In some of the largest provincial cities and towns the gas was supplied in a most economical manner by the municipal authorities, and he could not see why the same success could not be accomplished in London. He could not say that the board was very sanguine as to the passing of the bill to construct new works, and to lay down new mains throughout the whole of the metropolis and it was, therefore, thought desirable, in the event of success not attending their efforts in that direction, that the board should have something to fall back upon. Several propositions had been laid before them, and they had adopted a bill, and had lodged it at the House of Commons, for the purchase of the undertakings of the existing companies. There was another bill for the purchase of one of the gas companies by the municipal authorities of London, promoted by the Chartered Company, but the terms of purchase therein set forth were different to the terms of purchase proposed by this board. They, however, most certainly proposed that their undertaking should be purchased by the board and the corporation, and it might, therefore, be taken that the largest company in London concurred in the principle that the manufacture and supply of gas to the metropolis should be in the hands of the municipal authorities. Turning, however, to their proposal as to the terms of purchase, it appeared that the company suggested that they should have secured to them Consols, or an equivalent, yielding to them an amount equal to what they termed their statutory dividend of 10 per cent. per annum. This company was extremely modest in all their requirements, and he might say that they had so effectually succeeded in the last few years in always declaring a full dividend of 10 per cent., that he was not at all surprised at their present propositions. A fortnight ago a special meeting of the shareholders of the Chartered Gas Company was called for two objects. The first was to sanction the prosecution of the bill above referred to in Parliament, and the second object was that they should be enabled to raise additional capital to the extent of £500,000, to be divided amongst their present shareholders. He need scarcely say that resolutions for carrying out both these objects were carried with great unanimity, and especially the second. The chairman of that meeting spoke in very strong terms of the action of the board, characterizing the bills they were promoting as "shams," and saying that the board were "actually dishonest" in their scheme for supplying gas to the public. After commenting on some of the remarks made by Mr. Beck at the Chartered meeting, Mr. Newton proceeded to speak of the regulations intended to be introduced into the bill, which he said he was sure the board would give due weight to, as they had been the subject of repeated conferences between the committee of the corporation and the committee of the board, and they were now recommended to the board as being fairly those by which the whole of the companies in London might be regulated. There could be no question but that the consumers generally had suffered greatly from the inconsistent gas legislation within the past few years, and the present state of affairs in regard to it was such as to call for immediate action. It had before been explained on several occasions, that there could be no security against any increase of price, or any extravagant expenditure of capital, so long as the law remained as at present. Shareholders were now immediately interested in being extravagant in the expenditure of capital, knowing, as they did, that they could raise the price of gas so as to pay the full dividend of 10 per cent. on any additional capital that might be raised. If the principle laid down in 1868 had been followed in all cases, they would have been saved from the conflicting Acts of Parliament which had been recently passed, by which the standard of quality varied from 16-candle gas to 12-candle gas, and the price from 3s. 9d. to 4s. 6d. This was an anomalous state of things, and one which called for interference, and, consequently, these regulations were proposed. In order to secure efficient management, the rate of dividend should depend upon the price charged to the consumer. It was proposed, in the report, to abolish the Revision Commission, as not being likely to be much of a protection to the consumer, and because this board had no confidence in them whatever. Last year the Chartered Company, when before the commissioners, gave evidence that a price of 5s. 4d. was necessary for 1874, to enable them to discharge their ordinary obligations and pay a dividend of 10 per cent. The commissioners allowed 5s., but now it was shown conclusively that 4s. 6d. would have been quite sufficient. The whole of the City of London, and a large portion of the metropolis besides, had thus been called upon to pay 6d. per 1000 feet more than was necessary last year for the carrying out of the law with regard to this company. It was then said that the company were going to reduce their price to 3s. 9d. He argued that they were not reducing the price at all. It was simply a reversion

to the maximum amount the company were authorized to charge. In these regulations it was proposed that the maximum dividend should be fixed at 10 per cent., with a standard quality of gas of 16 candles, at the price of 3s. 9d. per 1000. So long as the dividends of the companies were dependent upon the charge for gas to the consumer, the consumers would have a better protection than before; for when a company did not pay 10 per cent., the directors would have a very uneasy time of it; and when the engineer failed to make gas so as to produce 10 per cent., his position would not be worth a year's purchase. By making the interest of the consumer and the shareholder identical, the officers and directors of gas companies would do more, perhaps, than heretofore to serve the former. He believed these regulations would give the consumers just the security they required. With regard to the companies which could produce a dividend out of a less sum than 3s. 9d., there was this provision, that no company should charge more than was necessary to produce a dividend of 10 per cent., so that if the South Metropolitan could continue to pay a dividend of 10 per cent. at 3s., the district served by that company would still continue to derive the advantage of this price, and would be secured from any high charges in the future. No increase of price beyond the maximum sum of 3s. 9d. could take place, unless the shareholders suffered a corresponding reduction in their dividend. He concluded by asking the board to approve generally of these heads of regulations which would have to be elaborated, and would be submitted again to the board in the form of a bill, copies of which would be supplied to the members.

Mr. Leslie vigorously opposed the motion, and pointed out that the principle advocated by Mr. Newton, of a reduction in the amount of dividend paid to the shareholders in proportion to the extent the price of gas was increased, was by no means a new one, and had actually been applied in the case of the West Ham Gas Company. He (Mr. Leslie) was not going to interfere with the board's proceedings in Parliament on their gas bills, as he was sure they would make a nice little mess of it without his assistance, and that would get such a dressing when they went before a committee of the House of Commons as they would never forget. It had been said that the South Metropolitan Company, while only charging 3s. per 1000 feet, had paid during the last year their full dividend of 10 per cent. They paid nothing of the kind out of the earnings of the year—that 10 per cent. was paid partly out of the profits of previous years.

Mr. Fowler said the South Metropolitan Company were now charging only 3s. per 1000 for gas of 14-candle illuminating power, whereas the new regulation proposed 3s. 9d. as the price, and 16 candles as the quality. Supposing such a thing were to happen that the South Metropolitan should supply gas of 16 candles, and charge 3s. 9d. instead of 3s. as at present, it would be likely to raise a strong feeling in the district. He did not himself think the recommendations of the committee would have this effect, but for the satisfaction of those consumers who might misconstrue the effect of the proposed regulations, he hoped Mr. Newton would add to the regulations a clause distinctly stating that when any company had an income in excess of the amount sufficient to pay their dividend of 10 per cent., the surplus should go towards diminishing the standard price. At the proper time he should move an amendment to that effect.

Mr. Dresser Rogers supported the view taken by Mr. Fowler. He did not want it to be thought that he was impeding the action of the board in reference to this matter, and as a member of the committee having the subject in hand, he quite endorsed all the regulations now proposed for adoption. The parish of Camberwell, which he represented, was entirely supplied by the South Metropolitan Gas Company. He was quite willing to admit that Camberwell had no right to request that they should be considered by themselves when the general question of the gas supply of the metropolis was under consideration, but at the same time he was bound to endeavour not to place them in a worse position than they now occupied, when by so doing no injustice would be caused to any other portion of the consumers. He knew that the general feeling of the members of the committee was that the districts supplied by the South Metropolitan and the Independent Companies should be fairly treated, and that no injustice should be exercised towards them, and he should be quite satisfied if the committee had power so to modify, if necessary, the clause 5 as to carry out in its integrity the real intention of the board, and he thought that would be effected if any excess of profits were obliged to be applied to reduction of price, and proper provisions were made to prevent large sums being improperly expended in salaries or additional works.

Alderman Sidney said he should be disappointed if Parliament did not give a favourable ear to the bill for the purchase of the undertakings of the gas companies, for he believed that it was the duty of such a board as this and the corporation of London to be the manufacturers and suppliers of gas to the whole of their constituents, and he had a very strong feeling that the price of gas when so supplied would not exceed 3s. That, of course, would be a very great saving. They had gone to Parliament for three bills, and it was now their duty to consider what should be the provisions of the third bill. He entirely differed from Mr. Fowler and Mr. Dresser Rogers as to the necessity for inserting any such clause as that proposed. The circumstances of the case, he thought, would be quite met by the fifth regulation, in which it was laid down that in no case should any company charge a price which would enable it to pay a higher dividend than 10 per cent. In his opinion, it would be manifestly unjust to these companies if in going to Parliament they sought for powers which would appear to be contrary to uniformity. It was said that the standard price should be 3s. 9d. Taking it for granted that the South Metropolitan Company, who were now charging 3s., had been paying their 10 per cent. out of their savings of former years, he thought it would be a great injustice to them if they found that they could not continue at the same price, that they should not be placed on the same footing as the other companies who had not been quite so considerate for the interests of the consumers.

Sir W. Codrington objected to the fourth regulation as to the 10 per cent. dividend. It was all very well to call it a maximum dividend, whereas, in fact, 10 per cent. was the minimum dividend the consumers were called upon to pay. While that was the case, there was no encouragement held out to the companies to charge less than 3s. 9d.

Mr. Richardson said he did not see the necessity for the amendment suggested by Mr. Fowler, but he thought the regulations deficient in one respect, inasmuch as there were no provisions by which the companies could be controlled in respect of the salaries to be paid to their officers, or in the expenditure on account of capital. He thought that the auditor should be empowered to disallow any charges such as those he had mentioned, beyond that which was customary.

Mr. Newton said, if the regulations now submitted were approved, they would be placed in the hands of the parliamentary draftsman, and then the manner in which the cases of the South Metropolitan and the Independent Gas Companies could be met would be clearly set out. With regard to Sir W. Codrington's point, if regulation 4 was omitted, there would be no maximum dividend fixed at all. When the bill was drawn, the principle referred to by Mr. Fowler would be expressed in definite terms.

Sir W. Codrington moved, and Mr. Redman seconded, an amendment to omit the 4th regulation, but it was negatived, and, after some conversation,

The report of the committee, as a whole, was put and carried.

Poplar.—At the meeting of the district board on the 2nd inst., a report was presented from the General Purposes Committee stating that they had considered the Commercial Gas Company's Bill, and they recommended that it should be opposed. They could not counsel further steps till they had viewed the site where it was proposed to erect new works. Mr. Cook said there was a large question raised in regard to this bill, and the subject wanted well considering before any decided action was taken, in order that the board might guard against playing into the hands of another and larger gas company. He had been told that the Commercial Company were contemplating an amalgamation with the Ratcliff, and that The Gaslight and Coke Company were opposing their bill, and trying to prevent it, so that there would be no help for them but to amalgamate with the largest company. The effect of the latter arrangement would be a great increase to the public in the price they paid for gas beyond what they now paid. The Gaslight and Coke Company could not, in fact, afford to supply gas at so cheap a rate as the smaller company, on account of the enormous amount of interest they had to pay. Looking at these facts, he thought it highly essential that they, as a board, should be cautious in taking any steps that might in any way play into their hands. He concluded by asking the board to well weigh the subject before proceeding to vote upon it. After some further discussion, the petition was adopted almost unanimously.

Holborn District.—At the meeting of the local board on the 1st inst., a letter was read from the Imperial Company, stating that the price of gas for the current year had been lowered to 3s. 9d. per 1000 cubic feet, being a reduction of 11d. from the price of last year. The charge, therefore, of supplying with gas, lighting, and keeping in order the street-lamps of the district would be £4 15s. per lamp per annum, instead of £5 18s. as heretofore. The letter was ordered to be entered on the minutes.

Dr. Stevenson's report on the gas supplied by the Imperial Company to the vestry of St. Pancras, during the months of December, 1874, and January, 1875:—Maximum light estimated by sperm candles, according to the Act—14·9. Minimum light, sperm candles—13·6. Average light, sperm candles—14·2. Traces of ammonia, indicated by turmeric test-paper—traces at all times. Traces of sulphuretted hydrogen, indicated by lead test-paper—none on any occasion. Sulphur, 24·20 grains per 100 cubic feet.

METROPOLIS WATER SUPPLY.

The following are the returns of the Society of Medical Officers of Health on the composition and quality of the metropolitan waters in January, 1875:—

Names of Water Companies.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	21·02	0·091	0·142	0·003	14·8	4·2
West Middlesex	20·67	0·062	0·147	0·001	14·3	4·4
Southwark and Vauxhall	21·30	0·086	0·140	0·003	14·9	4·2
Chelsea	20·07	0·084	0·131	0·003	14·1	4·2
Lambeth	20·87	0·131	0·167	0·002	14·4	4·2
Other Companies.						
Kent	27·90	0·004	0·258	0·001	20·6	5·8
New River	21·87	0·018	0·147	0·001	14·9	4·2
East London	23·73	0·066	0·181	0·002	15·7	4·6

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was more or less turbid—namely, in those of the Grand Junction, Southwark and Vauxhall, the Chelsea, and the Lambeth Companies. The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Society of Medical Officers of Health, 106,947,278 gallons; and the number of houses supplied was 514,118. This is at the rate of 31·4 gallons per head of the population daily. The last official return from Paris stated that the average daily supply per head of the population was 28·8 gallons; but this includes the water used for the public fountains, and for the ornamental waters in the Bois de Vincennes and the Bois de Boulogne.

Hy. Letheby, M.B.

METROPOLITAN BOARD OF WORKS AND THE WATER COMPANIES

FIRES IN THE METROPOLIS.

The following reply to the circular letter of the board, published in last week's Journal, has been sent by the Lambeth Company:—

"*Office of Lambeth Water-Works,*

"175, *Kennington Park Road, Jan.* 21, 1875.

"Sir,—I am desired by the directors of the Lambeth Water-Works Company to acknowledge the receipt of your letter of the 23rd ult., on the subject of the supply of water at fires.

"After much consideration of the matter on the part of the officers of the company, they report to the board that the suggestions thrown out in your letter would not, in their opinion, obviate any of the difficulties with which the question is at the present time beset. Even if the turncocks districts could be so arranged that the water could be turned on in certain parts, at certain fixed and unalterable times, and the fire brigade were made acquainted with the hours fixed for each part, these districts are so numerous that it is extremely improbable any fire occurring should just fit the time that the district in which it broke out had its services charged.

"Of course the Fire Brigade Committee's remarks can only refer to the service-pipes, as the leading mains are always charged.

"But with reference to the present intermittent service, it would be impossible to define precisely the times at which in certain districts the services would be charged, and when not, as this must vary with the state of supply, the season of the year, and other contingencies liable to occur from day to day.

"I am also directed to remind the committee that if the district services on the occurrence of a fire were already turned on, it would probably be necessary to turn some of them off, so as to concentrate the water on the fire, and it will thus be seen that the matter is too complicated, and depends upon too many chance circumstances to be much improved, excepting by the introduction of a constant supply of water. At the same time I am to state that my directors are fully alive to the importance of the subject, and would endeavour to carry out any really practicable improvement that could be suggested.

"Referring to the constant supply, I am to state that the directors now have under consideration the question of its gradual extension over the district, having for some time past been perfecting new works and mains with that view.

"I am, sir, your obedient servant,

(Signed) "W. S. Phipps, Secretary.

"J. E. Wakefield, Esq., Metropolitan Board of Works,
Spring Gardens, S.W."

Extraordinary Suicide in Paris.—A novel suicide is reported from Paris. An elderly man living in the Louvre quarter, having arranged his affairs, and stopped up all the holes in his room, turned on the gas, shut the door, and went out for an hour's walk. He then returned, got a lighted candle from the house porter, and proceeded to his room, which he opened suddenly. An explosion followed, and the man was burnt almost to a cinder.

BIRMINGHAM (CORPORATION) GAS AND WATER BILLS.

A Meeting of the Birmingham Town Council was held on Wednesday last—the MAYOR (Alderman Chamberlain) presiding.

The General Purposes Committee reported that in conformity with the instructions to them to prepare a bill for the transfer of the water-works company to the corporation, they had caused a bill to be prepared, and deposited on the 17th of December last in Parliament. The necessary petition to Parliament for leave to bring in the bill had also been prepared and lodged, and the committee now submitted it to the council for approval, and recommended that the mayor be respectfully requested to convene a public meeting of the ratepayers for the purpose of obtaining their consent to the application to Parliament for such bill, and that, subject to such approval, the committee be authorized to promote the bill in Parliament. The mayor had had several interviews with the chairman of the water-works company to negotiate terms for the purchase of the undertaking, but no definite conclusion could be arrived at, and a copy of the council resolution had been forwarded to the water-works company, with a request that they would inform the committee, upon what terms they were willing to treat for a transfer of their undertaking to the corporation. To this communication the water-works company replied, that having no reason to dispose of their undertaking, they were not prepared to suggest to the corporation any terms for its transfer.

The TOWN-CLERK had, by the direction of the committee, retained Mr. Michael as one of the counsel for the corporation, and had also retained Mr. Bateman, C.E., as consulting engineer on the bill. With regard to the opposition to the bills of the two gas companies, no steps would be taken in reference thereto beyond petitions for the purpose of securing a *locus standi* until the intentions of the promoters were made known, so as to enable the committee to determine what course should be pursued.

The council having gone into committee on the bill,

Mr. DAVIS asked upon what principle the purchase-money for the undertaking had been arrived at.

The MAYOR said he felt somewhat embarrassed in making the explanation desired by Mr. Davis, from the fact that he had been conducting private negotiations with the directors for some time past, the foundation of which had been a distinct pledge he gave to those gentlemen that, in case the negotiations should fall through, nothing of what had passed should be publicly revealed. He might, however, say that he had been greatly disappointed hitherto at the result of his inquiries. When he last addressed the council on the subject he certainly was under the impression that he had ascertained that the directors of the company were willing to sell to the corporation at a price which he should have had no hesitation in recommending the council to accept. When, armed with the resolution which the council passed on that occasion, he went again to the directors of the company, he found either that he had misunderstood them, or that they had raised their price in the interval, so that the probability was that they would only consider such a sum as he could not undertake the responsibility of recommending to the council. Under these circumstances it became necessary either to give the matter up altogether, or to proceed with the alternative suggestion of a bill for compulsory purchase. That, then, was what they now asked the council to do. It must be understood that this was a bill for compulsory purchase, but at the same time they did not altogether abandon the hope of a more amicable arrangement. It was still possible that in the face of the expense and anxiety which proceedings of this kind would occasion, and in the face of the strong desire which had been expressed by all classes of the population, and which he had no doubt would be confirmed by a meeting of ratepayers to consider the present bill—in the face of all that, the directors might be willing to be liberal in their dealing with the corporation. If that should be the case, it would be the pleasure of the General Purposes Committee to come before the council with definite terms. Meanwhile, they were going to Parliament to ask for powers to purchase for a fixed price. They had put in a price. It was not wise, perhaps, for buyers to put in the highest price they were willing to give, and Mr. Davis must not take it that one million sterling was necessarily the maximum which, under an amicable agreement, the corporation might be advised to give for the property. The way they had arrived at the sum of one million was by taking the actual value put upon the property in the market at the time the bill was prepared. They carried out the value of the shares on that day, and found it to be £1,010,000. Dropping the £10,000, they had put down one million. The council must not take it that Parliament would give them these powers. He did not think there had yet been a case in which power had been given to a corporation to buy at a price fixed by the corporation themselves. It was possible that the committee of the House of Commons would require the exclusion of this clause and the insertion of an alternative one, bringing the matter before an arbitrator. If that should be the case, it would be the duty of the General Purposes Committee to report to the council, and take their opinion upon the altered state of things. In view, however, of the fact that the Metropolitan Board of Works were asking for similar powers with respect to gas-works, he thought they were justified in attempting to secure similar results in the case of the water. The clause was then approved. The other clauses were also approved, and the council resumed.

Alderman HAWKES moved that the bill as a whole should be approved, subject ot such alterations as the council, under the direction of the town-clerk, might consider advisable.

The motion having been seconded,

Mr. BROOKE-SMITH suggested the sinking of good wells in the town for the supply of some of the inhabitants.

In reply to a question, the MAYOR said his own opinion was that, whereas there should be a profit made on the gas companies undertakings, the water company's works should never be a source of profit, as all profit should go in reduction of the price of water. As to the suggestion of Mr. Brooke-Smith, he did not believe surface wells would ever be wholesome in Birmingham. The water of an enormous proportion of the wells in Birmingham was totally unfit for domestic purposes.

Alderman SADLER drew attention to clause 74, in the Act of 1851, which provided that, "Wherever and so long as any building shall be supplied with water by the council for the purpose of domestic use, cleanliness, or drainage, they shall make a levy in addition to any other rate, a special rate called the water-rate, upon the occupier, and the rate so made shall be assessed upon the annual value of the buildings, ascertained in manner prescribed by clauses 175 and 176 of the Towns Improvement Act, 1847, &c. He wished to know whether there was anything in the bill which required the council to levy a water-rate upon persons who might not be using water; also, whether the passing of the present bill would repeal the clause in the Act of 1851.

The TOWN-CLERK said he thought unless that clause was expressly repealed in the new bill it would apply.

Alderman HAWKES said the provisions of the Act of 1851 were altogether different to what the council now proposed to do. The present was a bill for the transfer of the water company's undertaking to the corporation; in short, the only difference made would be that the name of the Birmingham Corporation would be substituted for that of the Birmingham Water-Works Company.

The motion was then carried unanimously, and the mayor was authorized to call a meeting of the ratepayers of the borough for the purpose of gaining their sanction to the proposed bill. The General Purposes Committee were authorized to promote the bills in Parliament, and to incur all reasonable and necessary expense in promoting the bill, subject to the sanction of the public meeting of ratepayers.

BIRMINGHAM (CORPORATION) GAS BILL.

THE ATTITUDE OF THE OUT-DISTRICTS.

SMETHWICK.

On Tuesday last a conference of representatives of the various local boards affected by the proposed transfer of the South Staffordshire Gas-Works to the Birmingham Corporation was held at the Public Hall, Smethwick, to consider whether joint action should be taken in opposing these bills. The following boards were represented:—Smethwick, Harborne, Balsall Heath, Handsworth, Oldbury, Tipton, and the West Bromwich Commissioners. Mr. A. KEAN, chairman of the Smethwick Local Board, presided.

A letter was received from the Aston Local Board, offering to join with the other boards in opposing the bills.

The question as to the desirability of joint action being taken was discussed, and it was agreed that joint opposition was necessary, but nothing definite was decided, and the meeting was of a preliminary character. A further meeting will be held this day, when a plan of action will be proposed. The meeting was adjourned for this purpose.

HARBORNE.

At the Monthly Meeting of the Local Board, on the 2nd inst., Mr. WEBB, who had been sent as one of the deputation from the board to the conference of clerks and delegates of other local boards, in reference to the opposition to the Birmingham Gas and Water Bills, reported that, after a deal of discussion, it was decided that the five clerks to the local boards should meet, and go through the whole matter, and ascertain the best and cheapest mode of opposing the bills. After reporting to their respective boards, a special meeting of each board would be called to decide the matter.

ASTON.

At the Monthly Meeting of the Local Board, on the 2nd inst., the CLERK stated that, if it was decided to oppose the Corporation Gas Bill, a public meeting of ratepayers would have to be convened, and their consent obtained. He had communicated with the authorities of Balsall Heath, Smethwick, Handsworth, and Harborne, with a view to the board amalgamating with them in opposing the bill, and thereby decreasing the expense; and, although he had not yet received any definite reply, he believed they were willing to co-operate with the board.

The CHAIRMAN moved the following resolution:—"That this board, for the promotion and protection of the interests of the inhabitants of the district, do oppose the Birmingham Corporation Water and Gas Bills now being promoted, and intended to be brought into Parliament during the ensuing session; and that this board do apply the public funds or rates under the control of the board in payment of the costs and expenses of such opposition." He pointed out that it was of very great importance that the bills should not be allowed to pass as they were at present constructed. The interests of the ratepayers of the manor were greatly affected, for the corporation would have it in their power to make them contribute, in an indirect way, to the funds of the borough. He contended, therefore, that the board should use every endeavour to oppose the bills in their present state, and to get inserted in them certain clauses protecting the inhabitants of the district, and placing them on an equal footing, as regards the water and gas rates, with the residents in the borough of Birmingham.

Mr. EVANS seconded the resolution, which was carried unanimously.

BALSALL HEATH.

A Meeting of Ratepayers was held on the 3rd inst., when a formal resolution was adopted, giving power to the local board to take the necessary steps for protecting the interests of the district, and opposing the bill of the Birmingham Corporation.

HULL GAS SUPPLY.—Mr. Baynes reports that an examination of the gas sent into the district of Sculcoates and Myton during the month of January, by the British Gas Company, gave the following results. The gas was constantly free from sulphuretted hydrogen, and free from ammonia.

	Max.	Min.	Mean.
Illuminating power standard sperm candles	16·41	14·46	15·47
Grains of sulphur per 100 feet	30·00	27·00	28·00
Grains of ammonia per 100 feet	—	—	·50

Mean barometer and temperature in experiment-room:—Bar., 30·07; tem., 58°.

SOCIETY OF ENGINEERS.—The first ordinary meeting of the Society of Engineers for the present year was held on Monday evening, Feb. 1, in the society's hall, Westminster Chambers, Victoria Street. At the conclusion of the ordinary routine business, the retiring president, Mr. W. Macgeorge, presented the premiums of books which had been awarded to the following gentlemen for papers read during the past year—viz., to Mr. J. Phillips, for his paper on "The Forms and Construction of Channels for the Conveyance of Sewage;" to Mr. G. G. Andre, for his paper on "The Ventilation of Coal Mines," and to Mr. S. H. Cox, for his paper on "Recent Improvements in Tin Dressing Machinery." The premiums having been presented, Mr. Macgeorge retired from the chair, receiving a warm vote of thanks from the meeting. He then introduced to the members the president for 1875, Mr. John Henry Adams, who proceeded to deliver his inaugural address. After thanking the members for having placed him in the presidential chair, Mr. Adams referred to the steady progress made by the society during the past year, observing that a number of new members had been added to the list, whilst the balance-sheet bore testimony to the satisfactory condition of the finances. He then reviewed the papers read during the past session, which he observed had afforded much practical knowledge not obtainable by any other means. The president then proceeded to notice the visits which had been made by the society to various engineering works during the vacation of 1874. Chief amongst those were the London Yard Engineering Works; the Ransome Stone-Works at East Greenwich; the new station of the Imperial Gaslight Company at Bromley; the works of the Thames Plate Glass Company at Blackwall; the rope-works of Messrs. Frost Brothers, at Shadwell; the twin ship *Castalia*, and Henley's Telegraph Works at North Woolwich, the main engineering and scientific features of which were described by the president. After recommending the members to evince an active interest in the society by attending its meetings and vacation trips, and by contributing papers and joining in discussions, the president referred to the deaths which had occurred in the society during the year. He regretted having to inform the members that during the past year the society had had the misfortune to lose by death Mr. Henry Dircks; Mr. William Martley, of the London, Chatham, and Dover Railway; Mr. Robert Broad, of the Horsley Iron-Works; Mr. James B. Greene, of Newport, Monmouthshire; Lieutenant Gordon Bigsby, R.E., and Sir William Fairbairn, F.R.S., whose deaths had occurred in the order in which their names were mentioned. After giving a brief memoir of each gentleman, the president turned to professional subjects of general interest, pointing out the practical progress the science of engineering had made during the past year. This was exemplified by a reference to railway works commenced or completed within the year; to the present position and practice of electric telegraphy; to the attempts now being made to improve the Channel passage; to various metropolitan improvements, and to several new mechanical devices which had been introduced to public notice during the past twelve months. All of these matters were described by the president, who closed an interesting address by a reference to the value and importance of the science of engineering. The address was well received by an appreciative audience, and at its close a cordial vote of thanks was accorded to the president. The concluding proceedings consisted in the election of a number of new members and associates.

MANCHESTER (CORPORATION) GAS SUPPLY.

PROPOSED ERECTION OF NEW WORKS.

At the Meeting of the Manchester City Council on Wednesday last—the MAYOR (Alderman King) in the chair—the Gas Committee submitted the following report:—

Your committee deem it their duty again to draw the serious attention of the council to the present position of the gas-works, and to the necessity which exists that increased means of production and storeage should, as soon as practicable, be provided.

It will be in the remembrance of the council that in September, 1869, your committee suggested the desirability of providing new works, which it was anticipated would probably occupy about four years in their construction and in getting them into full working order; and it was then stated that, calculating on the usual increase, the capacity of the existing works would be taxed to their utmost limit by the end of the present winter.

Your committee at the same time reported that they had purchased a plot of land which was, in their opinion, well suited for the purpose, and which possessed, in consequence of good access both by railway and canal, peculiar advantages, and asked for the sanction of the council to the erection thereon of new works. The council ultimately, in March, 1871, declined to approve of the recommendation contained in the report of the special committee, and from that date up the present time no steps have been taken. Without, however, incurring a grievous responsibility, your committee cannot longer delay bringing before the council their present position, and the absolute necessity that increased power of production should as early as possible be secured.

The anticipations of your committee in 1869 have been, as will appear from a short statement of facts, nearly realized.

The total estimated make of the two stations has been put down at 10½ millions per day, although it cannot practically be safely assumed to be more than 10 millions. The consumption on Dec. 10, 1874, was 11,017,000 feet, and on the 15th of December, 10,853,000 feet. The average consumption for five days, from the 7th to the 11th of December, was 9,987,000 feet, or an increase of 6 per cent. over five similar days in 1869; and in case a similar increase takes place, as may be reasonably anticipated, during the next two years, the daily consumption in 1876 would be 11,290,000 feet, or 790,000 feet in excess of the highest estimate of the present power of production; and in that case the only means possessed to meet such excess would be the surplus of make over supply on the previous Saturday and Sunday. Again, taking 18 successive days in December, including two Saturdays and Sundays (on many of which the public did not obtain the full supply of gas desired), the consumption averaged 9,145,000 feet per day, which at the same rate of increase will be 10,280,000 feet per day in 1876.

Your committee have had every retort in both stations at work during the present winter season, and although not all pressed to the utmost, yet, from their experience of the winter and the difficulty with men and materials, your committee would look with feelings almost of dismay to any attempt to meet, with their present powers of production, anything like the demand that the above reasonable estimate for 1876 suggests. However soon the orders may be given, your committee fear that it will be found difficult to organize a new station, to obtain plans, and to construct the necessary works, in time to prevent the public suffering inconvenience and the corporation loss from an insufficient power of production.

In conclusion, your committee may state that, although well known that they were prepared to receive proposals for the sale of land suitable for the purpose, only one site has been offered, which your committee were not able for a moment to entertain.

Your committee still believe that it is impossible to obtain a site more suitable in every respect than the site possessed by the corporation, and they feel satisfied that works may be erected and managed from which no reasonable objection on the ground of nuisance would arise; whilst it is important for the corporation to consider that if the means of satisfying the reasonable demands of their customers are not provided, other gas-works in the outlying districts, and possibly in positions in every point more objectionable, may be anticipated, which works will be carried on without any special desire to avoid nuisance, and will be in no degree under the control of the corporation.

Alderman LAMB moved the adoption of the report, saying that he did so more from a sense of duty than from pleasure; and if the Gas Committee could have felt that they were not incurring a very serious responsibility by longer delay, they would not now have ventured to disturb the harmony of the council. But the time had come when the truth must be told. The report showed that unless immediate steps should be taken to make more gas, the city might be in darkness next winter. In 1869 the Gas Committee, foreseeing what was coming, issued an important report, showing that if the increase of the annual consumption of gas continued at the same ratio as it had done for the last 30 years, then in 1875 the demand would be greater than the supply. In 1849 the annual consumption of gas stood at 354 million cubic feet; in 1859 it had risen to 698 millions; and in 1869 to 1335 million cubic feet. In each decade the consumption of gas was nearly doubled. The Gas Committee, foreseeing what was likely to happen, after inquiry purchased a plot of land near Philips Park, five years ago, with the object of extending the gas-works, but the council at that time refused its permission to build new works. The land had since been lying useless, but now the Gas Committee had come to the end of their tether. The committee had not been able to make the gas which was required. Every retort which they had, had been at work constantly, every scrubber and purifier was in full work, and they could only make 10,500,000 cubic feet per day. They had never one full day's supply of gas in store. Up to last December the city had never consumed 10 million cubic feet per day. On the 10th of December the make was little more than 9 millions, and the consumption was above 11 million cubic feet. On the 28th of December, the Monday after Christmas-day, the make was about 8 million cubic feet, and the committee found it dangerous to supply more than 7 or 8 millions, but it was estimated by Mr. Peacock that on that day they could have sold from 12 to 13 million cubic feet. The committee now asked the council to authorize them to erect new works on the land belonging to them at the Bradford Cemetery. That land appeared to be designed by nature for what was proposed. The retorts and holders, being in a valley, would not be visible from the Ashton Road on one side, or the Bradford Road on the other. There was clay on the ground sufficient to make the bricks that would be required for building purposes, and the ground was three times the area of the Gaythorn works. There was a half circle of railway close to the site, the line there being the link between the Manchester, Sheffield, and Lincolnshire, the Midland, the London and North-Western, and the Lancashire and Yorkshire Railways. There was a canal also near, so that they could use it for bringing cannel coal or taking away coke, as well as the railway. By their additional holders they would have such a supply of gas as would enable them to wipe off the standing disgrace of Sunday labour. The new holders which it was proposed to put down would increase their storeage room to 21,280,130 cubic feet, and thus there would be no difficulty in meeting the requirements of the town on Saturday without Sunday labour. The argument that the neighbourhood would be spoiled by the erection of gas-works would not hold against the experience of neighbourhoods near London, where vegetation flourished, and where house property realized a rental of from £250 to £300 a year in the vicinity of gas-works. Besides, the Manchester Gas-Works Committee were conveying pipes from their works at Rochdale Road to Spence's chemical works, by which the ammonia was taken away from the district. The people in that neighbourhood did not seem to regard the works as a nuisance, and some even asked permission to bring children suffering from whooping-cough to the purifiers at the works, in the idea that they were cured by inhaling the vapours.

Mr. CRAVEN seconded the motion. He said the present gas supply, though estimated at 10 million cubic feet per day, did not average so much, and he scouted the idea that they could spoil the neighbourhood of Philips Park by erecting new works there. They could not make it worse than it was.

Mr. W. SMITH, in moving the adjournment of the council on account of the lateness of the hour, remarked that the river entered the city near the proposed site for the gas-works, and ran through it in a downward direction, and the gas would have to be forced down in order to supply the town, instead of rising naturally. The land itself was unequal. The answer to the argument that the works would destroy the neighbourhood was frivolous. Much money had been spent in improving the park and cemetery, and the argument for protecting them was entitled to consideration. At that late hour he would move the adjournment of the council.

Mr. W. S. BROWN seconded the motion for adjournment. He did not think it desirable to dispose of the report that day, especially as the important question of the site was to be decided by the discussion.

The council then agreed to adjourn for a fortnight.

MANCHESTER (CORPORATION) WATER-WORKS.

At the Meeting of the Manchester City Council on Wednesday last, the Annual Report of the Water-Works Committee was laid on the table. The statement of accounts showed that the public water-rate for 1874 yielded £22,441, and the domestic rate £24,127. The water sold for trading purposes, including rentals for domestic supply beyond the limits of the city, yielded £89,644; the annual payment from Salford, £6500; the arrears of 1873, £11,800; chief and other rents, £1490; bankers and other interest, £5607; and these, together with a balance owing to bankers of £18,870, and some smaller items, made up a total of £180,906. The chief items of expenditure were:—Balance owing bankers at December 31, 1873, £11,075; interest upon loans and annuities, £87,431; chief and other rents, £3521; rates, taxes, tithes, &c., £5921; sinking-fund account, £20,736; expenses of working and management, £14,394; works at Woodhead reservoir, £17,567; damage caused by flood at Bottoms Lodge reservoir bank, £3600; wages in connexion with general business of the department, £4241; salaries, £3794; collection of rates and rentals, £3755; printing, stationery, and advertising, £1099. The total length of piping taken up for renewals and alterations during the year was 8726 yards, and the total length of piping laid 12,492 yards. The total length of piping laid in extensions of mains and service mains was 16,881 yards. The report further stated that during the past year the committee had again paid out of revenue an additional amount of interest accruing upon the further cost incurred for the works being executed in the valley of Longdendale, and also the expenditure which had been incurred in the works at Woodhead reservoir, and in the enlargement of the flood watercourse from Crowden to Torside. The cleansing and pitching of the lower reservoir at Gorton was making satisfactory progress, and would be completed by the end of the present year. The committee recommended to the council to make and order a public water-rate of 3d. in the pound, and a domestic water-rate of 9d. in the pound, to be made and levied upon all property assessed thereto, for the purpose of raising the amount required for payment of the expenses connected with the supply of water within the city during the year commencing on the 1st day of January last. The amount of estimated available rates outstanding on the 31st of December, 1874, out of a gross sum of £45,714 8s. 6d., was £35 6s. 9d.; and of rentals £67 11s. 10d. only, out of a gross sum of £99,038 4s. 2d.; and no arrears on account of rates or rentals for any previous year were outstanding, and no warrant of distress had been levied during the year. During the past year all the completed reservoirs and works connected therewith, and the whole of the piping, had been maintained in a satisfactory condition. A new 12-inch main, 3248 yards in length, extending from Oxford Street to Whalley Range, and a new 7-inch main, 905 yards in length, extending from Lloyd Street, City Road, to the junction of Chester Road, had been completed, at a cost of £3704 9s. 4d. The works at Woodhead embankment had made satisfactory progress during the year, and water could now be held in this reservoir to about 13 feet below top level, or to the extent of upwards of 800 million gallons, and by the termination of the year the embankment would be raised to its top level. The enlargement of the flood watercourse from Crowden to Torside reservoir was completed.

The following are the estimates of the income and expenditure for 1875:—

Estimated Income.

To the public rate of 3d. in the pound on an assessment of £1,844,072, less 1 per cent. for loss in collection, and which rate it is estimated will raise about	£22,820	
The domestic rate of 9d. in the pound on an assessment of £729,970 15s., including a minimum charge on cottages—viz., 4s. each for cottages externally supplied with water, and 5s. each for cottages internally supplied, deducting 20 per cent. for composition and 9 per cent. for loss in collection on the remainder, and which rate it is estimated will raise about	23,972	
		£46,793
Estimated receipts for trading purposes and domestic supply out of the limits of the city, after deducting 2 per cent. for loss in collection, as follows:—		
Trade rentals within the limits of the city	£41,902	
Ditto beyond such limits, including supply for domestic purposes	63,423	
	105,325	
Annual payment from Salford	6,500	
		111,825
Chief and other rents	2,699	
Miscellaneous receipts	500	
Bankers and other interest	5,000	
Estimated deficiency, £3084.		8,199

Estimated Expenditure.

By excess of liabilities, 1874		10,003
Interest upon the mortgage debt of the late water-works company—viz., £22,700, at 4 per cent.	908	
Interest upon Corporation Water-Works Loans (1847) Act—viz., £28,300, at 4 per cent.; £45,000, at 4¼ per cent.; and £15,000, at 5 per cent.	3,794	
Interest upon perpetual annuities, at 4 per cent. (£135,406)	5,416	
Interest upon Corporation Water-Works Loans (1854) Act—viz., £971,393 2s. 4d., at 4 per cent.; £16,500, at 4¼ per cent.; and £3012 10s., at 4½ per cent.	32,492	
Interest upon Corporation Water-Works Loans (1860) Act—viz., £95,996 13s. 9d., at 4 per cent.; and £8800, at 4¼ per cent.	4,213	
Life annuities (£212,756)	8,510	
Interest upon Corporation Water-Works Loans (1863) Act—viz., £87,666 13s. 4d., at 3½ per cent., and £33,870, at 4 per cent.	4,423	
Interest upon Corporation Water-Works Loans (1865) Act—viz., £50,080 8s., at 4 per cent.; £2000, at 4¼ per cent.; and £700, at 4½ per cent.	2,119	
Interest upon Corporation Water-Works Loans (1867) Act—viz., £111,893, at 4 per cent.	4,475	
Interest upon Corporation Water-Works Loans (1869) Act—viz., £147,454, at 4 per cent.	5,898	
Interest upon Corporation Consolidated Stock, at 4 per cent. (£293,355)	11,734	
Interest upon amounts owing for lands, compensation, &c.—viz., £91 1s., at 3½ per cent.; £11,094 2s. 10d., at 4 per cent.; and £120, at 5 per cent.	453	
Interest upon amounts to be hereafter borrowed for extension of works	500	
		84,939
Chief and other rents		4,509
Rates, taxes, and tithes		6,000
Sinking-fund account		22,345

Expenses of Working Management, &c.

Materials, contracts, wages, and expenses connected with the repairing and upholding of reservoirs, watercourses, conduits, piping, and contingencies, including renewal of mains	11,000	
Works at Woodhead reservoir	10,000	
Cleaning and repairing Gorton reservoir	6,000	
Wages in connexion with the general business of the department	4,500	
Salaries	3,400	
Collecting of water-rates and rentals	3,800	
Printing, stationery, and advertising	1,000	
Stamps for annuities, mortgages, &c.	1,300	
Miscellaneous expenditure	800	
Bankers commission	300	
		42,100
Total		£169,902

The report was received, and the rates as recommended were ordered to be levied.

AVERAGE METER SYSTEM IN LONDON.

At the Meeting of the Paddington Vestry on Tuesday last, Mr. Miller, the chairman of the Gas and Water Committee, brought up the following report, which was adopted, and ordered to be printed:—

Report of the Gas and Water Committee.

Your committee beg to report, for the information of the vestry, that the average meter system has now been in full operation in the parish for upwards of three months, and that the results achieved in the working thereof are recorded in the accompanying statement.

The vestry is aware that during the last quarter intense and continued frosts prevailed, and the meters attached to every twelfth lamp in the parish have consequently been subjected to most severe tests; but, notwithstanding these trying circumstances, they have registered correctly, proving that wet meters, if properly made and charged with glycerine and water, are not affected by frost or severe weather.

It will be seen by the statement above referred to that the 5-feet burners and governors attached to the public lamps, all of which were new at the time the average meter system was introduced, do not pass more than 4·77, or about 4¾ feet per hour, and that the saving effected in the consumption of gas for the quarter ending the 31st of December last has been 1,485,986 cubic feet.

All of which your committee beg to submit. (Signed)

Paddington, Jan. 29, 1875. HORATIO MILLER, Chairman.

Table showing the Hours of Burning and Consumption of Gas for One Street-Lamp during the Quarter ending Dec. 31, 1874, *under the Old and New Systems.*

Month, 1874.	Old System.		New System.						
	Average Hours between Sunset and Sunrise.	Quantity at 5 Cubic Feet per Hour.	Modified Hours of Burning.	Estimated Consumption at 5 Cubic Feet per Hour.	Actual Consumption per Hour by Meter.	Actual Quantity as indicated by Meter as agreed.	Saved by Meter Indication.	Saved by Modified Hours and Meter Indication.	Saved in Gas on 1711 Lamps during the Quarter ending Dec. 31, 1874.
	Hours. Min.	Cubic Feet.	Hours. Min.	Cubic Feet.	Cubic Feet.	Cubic Feet.	Cubic Feet.	Cubic Feet.	Cubic Feet.
October	407 39	2040	371 45	1858·75	4·82	1826·58	32·17	213·42	365,162
November	455 0	2275	414 25	2072·08	4·78	1928·77	143·31	346·23	592,399
December	502 12	2510	467 15	2336·25	4·71	2201·16	135·09	308·84	528,425
Totals for the quarter . . .	1364 51	6825	1253 25	6267·08	..	5956·51	310·57	868·49	1,485,986

Jan. 28, 1875. (Signed) GEORGE WESTON, Inspector of Public Lighting, Paddington.

APPLICATION OF ILLUMINATING GAS TO THE PYROPHONE.

In a recent communication to the *Comptes Rendus* of the Academy of Sciences, M. F. Kastner gives details of his method of applying illuminating gas in place of pure hydrogen in working the new musical instrument, the pyrophone, of which he is the inventor. He states that, having made a number of experiments upon the properties of singing flames produced by the combustion of hydrogen gas, he has ascertained that if, in a tube of glass or other suitable material, two or more isolated flames of proper size be introduced, and placed at a point corresponding to one-third of the length of the tube, reckoning from the base, such flames will vibrate in unison. This phenomenon continues as long as the flames remain separated, but the sound ceases as soon as they are brought into contact.

As a practical application of this principle, M. Kastner has constructed the musical instrument above referred to, which bears some resemblance to an organ, though differing from it in this respect, that, instead of being operated by atmospheric air blown in, the notes are produced by the singing of flames within the pipes, upon the dimensions of which the quality of the sound, its pitch, and intensity, of course, depend.

It is well known that when a jet of pure hydrogen gas is burned in a tube of glass, china, or other vibrating material, a pleasant soft tone is produced, but it is the employment of this particular gas in connexion with the pyrophone that has hitherto been the chief obstacle to the generally satisfactory working of that instrument. In practice, the use of hydrogen gas is undoubtedly attended with certain inconveniences. In the first place, it is difficult to prepare; next, it necessitates the employment of large gasholders for its storeage; lastly, it is dangerous. Having these facts in view, M. Kastner decided on abandoning the use of pure hydrogen, and instituted a series of experiments with the object of ascertaining whether ordinary lighting gas, which is at all times easily procurable, would not be equally applicable for his purpose.

In the course of his experiments he found that no sound could be obtained from the combustion in a glass tube of two separate flames of ordinary gas, and this he attributed to the presence of carbon in the flames. He also ascertained that although a perfectly clear sound was obtainable from the combustion of pure hydrogen gas—that is, without the interposition of any solid body in the flames—it was impossible to make the tube vibrate when ordinary lighting gas was employed, even though the flames burned under precisely similar conditions. He came to the conclusion, therefore, that it would be necessary, by some process or other, to eliminate the carbon from the gas, and this result he achieved in the following manner.

On examining the combustion of ordinary lighting gas in a tube of glass, metal, or other suitable material, it is found to produce a flame which is either luminous or resonant. When the flame is simply luminous—that is, when the air in the tube does not vibrate—it takes an elongated shape, pointed at the top, but broad towards the centre, and burns with so little rigidity that the slightest current of air suffices to make it unsteady. On the other hand, when the flame is resonant—that is, when it causes in the tubes the vibrations necessary to the production of sound—its form is contracted at the centre, but spread out at the top. As long as the air in the tube vibrates, the flame burns with great rigidity, throwing off its carbon, so to speak, by a self-contained mechanical power.

In point of fact, resonant flames produced by the combustion of ordinary illuminating gas are surrounded by a photosphere which does not exist when the flame is simply luminous. In the latter case the carbon burns in the flame, contributing a large proportion of its light-giving power. But, in the case of resonant flames, the photosphere by which each single flame is surrounded contains an explosive combination of oxygen and hydrogen, which determines the vibrations of the air in the tube.

In order that the sound may be produced in all its intensity, it is necessary that the *ensemble* of the detonations produced by the molecules of oxygen and hydrogen in a given time should agree with the number of vibrations corresponding to the sound produced by the tube. To effect this it occurred to M. Kastner to increase the number of his flames, and by thus augmenting the number of detonations produced by the oxyhydric mixture in the photospheres, determine the amount of vibration of air in the tube. Instead, therefore, of employing only two flames of pure hydrogen, he arranged four, six, and even more jets of ordinary lighting gas in the same tube. He noticed also that the greater the height of the flame, the more carbon it contained; but this he was enabled to rectify by making his flames smaller, at the same time increasing their number, so as to obtain a total surface of divers photospheres sufficiently large for the production of vibrations. The amount of carbon contained in all the small flames together would always be much less than that which would be found in two large flames necessary for producing a similar sound. As long as the flames were kept apart, sounds were produced whose *timbre* was as clear as those resulting from the combustion of the pure hydrogen; but the moment the flames, or rather the photospheres corresponding to the flames, were brought into contact, the sound immediately ceased.

When the flames are resonant, the carbon contained in ordinary illuminating gas is almost entirely eliminated; in fact, a very sensible deposit of it takes place upon the interior surface of the tube, at a point corresponding to the height of the flames and below it, and this deposit increases as long as the air in the tube continues to vibrate. The pyrophone may now, therefore, be said to act equally as well with ordinary gas as with pure hydrogen.

The phenomenon of interference is produced under exactly similar conditions for both gases, the flames always occupying the same position in the tube—viz, at a third of the distance from the base. In his paper, however, M. Kastner describes a new process for stopping the sound. Supposing that one or more flames, placed in a tube at the point above indicated, determine the vibration of the air in the tube, if a hole be pierced at that particular spot the sound will immediately cease. Applying this principle, a musical instrument might be constructed which would be a species of flute acting with singing flames. Such an instrument would, however, from a musical point of view, be very imperfect, inasmuch as the sound would not be so effectually stopped as when recourse is had to the phenomenon of interference. If, instead of making an opening in the tube at the distance of a third from the bottom, one were made at the distance of a sixth, the sound would continue, but the note produced would not be the same, but its sharp.

In all these experiments the formation of ozone was easily perceptible as soon as the flames caused the air in the tube to vibrate; but the presence of this body may be ascertained by any of the well-known chemical reagents.

PREMIUMS FOR SANITARY IMPROVEMENTS IN LIVERPOOL.—At the meeting of the Liverpool Town Council, held on Thursday last, a letter was read from Mr. Wm. Bennett (a retired alderman, who has been for many years an enthusiastic sanitary reformer) offering the sum of £3000 towards the establishment of an aquarium, the disconnexion of sewer gas from dwelling-houses, and a series of boring experiments to be conducted in the neighbourhood of the town, with a view to obtain an additional water supply, the existing town wells having become largely contaminated as the town has increased. In his letter the generous donor remarks: "As to the second portion of the gift, I attach no other condition than that prompt action be taken. I have my own views as regards making these court houses into healthy and well-ventilated dwellings; but as the immediate cutting off of all sewer connexion is so important for the saving of life and the checking of excesses, drunkenness in particular, I shall attach no conditions that might cause delay. Respecting boring for water supply, I reserve the right of approving of the engineer employed. I do not admit that supplies beyond those we can at present control are required for the next half century; but, to satisfy the minds of those who think differently, and for practically ascertaining by trial the correctness of a theory I have long and strongly entertained, I will gladly expend £1000, or more, if I find this sum is not sufficient." The letter was referred to the Health Committee. The Town Council, at the same meeting, resolved—"That the Health Committee be authorized, if they think it desirable, to appoint a deputation to the Home Secretary and the President of the Local Government Board, to urge upon Her Majesty's Government the importance of increased powers, and facilities being given to municipal authorities to acquire, and demolish buildings the removal of which would improve the sanitary condition of the town, and such other amendments of the Sanitary Acts in matters of detail as to the Health Committee may seem desirable."

EXPLOSION IN A PURIFIER-HOUSE.—We learn from the *American Gaslight Journal* of a fatal accident which happened at the St. Louis Gas-Works on the 13th of December last. It appears from the account that Mr. Pratt, who was chief engineer of the works, and had been such for a quarter of a century, went into one of the purifier-rooms about three p.m., to make an examination. In a few minutes afterwards a loud explosion was heard, and four of the *employés* immediately rushed for the spot. On entering the building, they found Mr. Pratt lying dead on the iron floor, within 16 feet of the door, and they noticed that one of the purifying-tanks had exploded. This purifier-room was 50 feet square, containing four purifiers 21 feet square and 4 feet deep. These had been idle for nearly a year. They had been put in operation again for a week, and did not work satisfactorily. For this reason Mr. Pratt went into the room to learn the cause of the trouble. Mr. Pratt was thrown some 20 feet, struck the edge of one of the tanks, which crushed his chest, and in falling his head was severely bruised. The cover of the tank was torn off and twisted, and the lime shelves were curled up and scattered. The force of the concussion tore a large window out of the building. At the inquest an opinion was expressed by one *employé* of the company, that "the explosion was caused by Mr. Pratt trying the air-valve when there was a back draft into the tank." The verdict was merely death from "an explosion of the gas-purifying tank, from some cause not known." The deceased gentleman was born at Loughborough, England, in 1802. In 1827 he emigrated to the United States, and the same year returned to Calais, France, where he remained five years, and then went to London, in both of which places he worked at gas-fitting. In 1834 he left for the United States, landing in New York, from whence he went to Pittsburgh, where he worked for the gas company in 1837, and removed to Cincinnati in 1842, acting as superintendent and chief engineer of the gas-works there. He went to St. Louis in 1848, to take a similar position, which he held up to the time of his violent and sudden death. Although near 73 years of age, he was a youth in energy, and, among other great business operations, one of his latest projects was the reviving and working of the Chihuahua silver mines in Mexico. Another was the introduction of a new dry gas-scrubber, founded on the principle of prolonged contact with extended surfaces, a principle in which he had enthusiastic confidence. He was also largely interested as a stockholder and builder in the gas-works of Kansas City and St. Joseph, Mo., Quincy, Ill., Denver, Col., and several other Western cities. His accumulated fortune is estimated at a large figure. He leaves a son, Mr. C. R. Pratt, who is superintendent of the St. Louis Gas-Works. The funeral was an impressive occasion; the line of carriages is stated to have been over two miles in length. In the resolution of his board of directors occurs the following passage:—"His integrity, capacity, and efficiency in the economical management of the gas-works, make his loss very severely felt. He was upright in all his business relations, and by his many good qualities won the respect and esteem of those who were associated with him."

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

Nothing of very material interest has transpired during the week in connexion with the local iron trade, excepting the fact that two or three of the North Derbyshire iron and coal companies have issued their half-yearly reports, or have declared dividends for that period. These dividends are very reliable indications of the condition of trade during the semi-annual period in question, the falling off of activity being necessarily accompanied by a proportionate diminution of profits. Taking the case of the Sheepbridge Coal and Iron Company, I find that the interim, or half-yearly, dividend has just been declared at the rate of 12½ per cent. per annum. The shares being £55 each, paid up, it follows that the dividend is £3 8s. 9d. per share. In the corresponding half of 1873 the dividend yielded £6 10s. per share. Then again, the Staveley Iron and Coal Company, the productions of which are so well known to almost every gas and water engineer and manager in the kingdom, are unable to declare more than £4 per share on the A shares (£60 each, paid up), as against £5 for the similar half of last year. It is thus plainly shown that, even at establishments such as those just named, which possess collieries and every other necessary adjunct to render their iron-works plant economically efficient, the conduct of business during the past year was difficult, and only accomplished at more trouble, with a less amount of ultimate profit.

The waggon companies of the district are, as a rule, issuing very favourable reports, the demand for waggons being largely on the increase, owing to the recent and current great growth of the iron-works and colliery capabilities of this and other localities.

The ironfounders are pretty well engaged, but are not busy as a rule. There is a very keen competition for the few good orders in the market between the manufacturers of this and other iron districts, often to the advantage of the latter. There is no very remarkable change in the price of or demand for pig iron for foundry and forge purposes. Agents for North Yorkshire brands quote net prices at about the following:—No. 1 foundry, 62s. to 63s.; No. 2 foundry, 60s.; No. 3 foundry, 58s.; No. 4 foundry, 56s.; No. 4 forge, grey, 55s.; No. 5 forge, mottled, 54s.; No. 6 forge, white, 52s.; refined metal, 74s.; Kentledge, 62s.; and cinder pig, 42s. 3d. per ton.

As was anticipated in my last week's report, there have been alterations in the price of fuel, mostly in a downward direction, with the advent of February. The South Yorkshire steam coalowners new price for best steam coal to large buyers is placed at 12s. per ton. Gas coal rules at about 11s. to 12s. at the pits. Several firms have reduced slack coal 1s. per ton, and others have put down their quotations for several kinds of house coal.

IRON AND COAL TRADES OF SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The finished iron trade of this district is not quite so steady as reported a week ago. Many of the makers of branded iron now experience a falling off in the demand, though they are still able to maintain their works in full production; best sheets, however, are in good request, and makers of some of the leading brands are busy, some considerable orders for tin-plates and roofing-sheets having recently been distributed. The makers of inferior qualities of iron are very short of orders, and prices are again weaker. Bars of fair quality have been offered during the week at £8 12s. 6d., which is 2s. 6d. per ton under the minimum quotation ruling a few weeks ago. Many specifications are still withheld in hope of a general reduction in prices, but quotations will be mainly regulated by the condition of the coal trade. Some merchants are now offering iron at a lower figure than makers care to quote, in order to reduce their stocks, and though, of course, only small lots are thus offered, it naturally tends, in some measure, to depress the market.

Pig iron is still in brisk demand, and all classes fully maintain their value. The supply of native ironstone is not yet equal to the demand, and quotations are firm at 21s. to 22s. per ton. No additional furnaces have been put into operation lately, but it is expected that several will be relighted shortly. It is computed that there are 73 blast-furnaces in the South Staffordshire and East Worcestershire district now standing idle.

Around West Bromwich the iron foundries are in well-sustained operation, and gas and water mains are in noteworthy request. The coal trade has been somewhat strengthened by the South Wales strike, as regards the best qualities, but there is no improvement in the demand for manufacturing fuel of second quality. Slack continues very slow of sale. On the Dudley side of the district it has just been reduced by 1s. 6d. per ton, making the average selling price 4s. 6d. per ton, but in the Wolverhampton district slack is in abundant supply at from 2s. 9d. to 3s. per ton at the pit's mouth, though the quality is somewhat inferior.

The strike in the wrought tube trade of Wednesbury, predicted in our last report, is now, unfortunately, an accomplished fact, the operatives employed at the Crown, the Church Hill, and the Alpha Works having turned out against the proposed increase in the hours of labour. The number already on strike is about 1000, and the union is being backed by the various labour organizations represented at the recent Trades Congress at Liverpool. The condition of the tube trade has for some time past been very unsatisfactory, the limited demand having brought down prices to very nearly the level at which they stood when iron was 30 per cent. cheaper, and fuel at about half its present price. Considerable extensions have recently been made at the Crown Tube-Works, with the view of facilitating the manufacture of stocks and dies, and all descriptions of tools used in connexion with wrought tubes and fittings.

THE COAL AND IRON TRADES OF LANCASHIRE.

(FROM OUR OWN CORRESPONDENT.)

There is no difficulty in selling the better classes of coal; in fact, in the Manchester district the demand is in excess of the supplies, and in house coal there are still in some cases orders on hand, which were taken before Christmas. For furnace coal there is a very good inquiry, and for gas coal the demand continues active, although the season of the year is beginning to lessen the consumption. Prices in the Manchester market are very firm, without, however, any material alteration, and the average delivery rates range about as under:—Best house coal, 18s. to 19s. per ton; seconds, 16s. 6d. to 17s. 6d.; common, 14s. to 15s.; furnace coal, 12s. 6d. to 14s.; burgy, 10s. to 10s. 6d.; and slack about 8s. per ton. In the Liverpool market there is a hardening tendency in consequence of the South Wales lock-out, and steam coal especially is dearer; but good supplies of fuel are being sent in from St. Helen's, Widnes, and the neighbouring district, where the continued dulness in the chemical trade has thrown a good deal of burgy and slack upon the market, and small stocks have accumulated. In the Wigan district matters remain in much the same position as last reported, with the exception that shipping coal is now obtaining a better price. Good qualities of coal are in demand, and although the poorer descriptions do not sell quite so readily, there is not much put down in stock. The pit prices are not materially altered from those last quoted.

The coke trade has been rather fluctuating. There are still many inquiries in the market, but these do not result in much buying, and only a moderate amount of business is being done, with prices unaltered.

There are still many complaints of the great delay in the railway deliveries of coal, and the matter was again brought under the notice of the South Lancashire and Cheshire Coalowners Association at the usual monthly meeting last week, and it is now probable that some definite action in the matter will be taken before long.

The council of the Miners National Association have been holding a meeting in Manchester, under the presidency of Mr. Alexander M'Donald, M.P. The chief discussion naturally turned upon the South Wales lock-out, and as soon as the association can obtain full particulars respecting the position of the men locked out, it is not improbable that measures will be organized for affording support in the struggle.

A temporary spurt was given to the iron trade of the district during a portion of last week by the apprehension entertained that the reduction of wages in the Cleveland district would lead to a turn-out on the part of the men; but now that the matter is virtually settled, the market has resumed its previous dull tone, and prices are weaker. No. 3 foundry pig iron, Middlesbrough quality, delivered in this district, can be bought at 66s. 3d. per ton; No. 4, 65s.; and No. 4 forge, at 64s. 6d. per ton. There is not much doing in manufactured iron, and the few orders which have been placed have generally been at very low rates. Middlesbrough was delivered out quoted at £8 17s. 6d.; light rails, £7 10s.; heavy ditto, £7 per ton; plates, £10; and angles, £9 2s. 6d. per ton. Many of the merchants are selling out of stock at very low prices, in the expectation that the market will come down.

Some of the iron-works are moderately well employed; but taking them all together, there are complaints of a scarcity of orders.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The demand for gas coals is very fully sustained. The week before last not less than 30,000 chaldrons of coal were shipped from the Tyne Dock, the larger proportion of which were gas coals. Small ships have been wanted to load household and gas coals for the bye-ports, but small vessels are somewhat scarce, and there is a difficulty in securing the requisite tonnage to complete the orders. Notwithstanding the brisk business that is doing at the gas coal pits, a very limited number of contracts have been entered upon for the year ensuing, and nearly all the business transacted in this trade is being done in the open market. Household coals are in fair inquiry, though a dulness prevails in the London market. The lock-out in the South Wales district, as stated last week, is likely to improve the demand for Northumberland steam coal, so long as that lock-out continues. More large vessels sailed with cargoes from the Tyne last week than had been known for a considerable period, and London merchants will be obliged to send their vessels down to the Tyne to load, because they cannot get coals in the Welsh ports. The principal demand for vessels to load coals continues to be in the coasting trade; however, though more vessels undoubtedly are taking in cargoes for foreign ports, at present it is too early for much business to be done to the Baltic, but as merchants are in want of coals in the Mediterranean, more has to be sent at a somewhat higher rate of freights thence.

The iron trade of the Cleveland district is moderately firm, and in consequence of the difficulties in the iron trade of South Wales, prices of north country iron are pretty stiff. The manufacturing iron trade is without much change. There are numerous inquiries for rails, but merchants hang back until they see how the wages disputes will turn.

The chemical and manufacturing trades of the North of England are extremely quiet. The north country chemical manufacturers suffer a good deal at present from the effects of foreign competition, and, without there is a considerable improvement in business from America, which is their best market, the chemical trade of the Tyne is not likely to rally very much with the spring.

The men employed in the principal iron ship-building yards of the Tyne are out on strike against a proposed reduction of something like 3s. per week on their wages. The chain and anchor smiths have likewise turned out against a reduction of 3d. per cwt., and the Durham pitmen have received notice of a reduction of 20 per cent. in their wages. The Northumberland coalowners and their pitmen came to a final agreement last week to refer their wages dispute to arbitration. At one time there were grave fears lest negotiations should pass off, and there would be a strike.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

During the past week the gas question, in one shape or another, has been "up" before the meetings of no fewer than four gas corporations in Scotland—namely, Glasgow, Dundee, Aberdeen, and Forfar. At the ordinary monthly meeting of the Glasgow Town Council, acting as the Gas Commission, it was reported by the Gas Committee that a correspondence had been going on with the Board of Trade regarding the Provisional Order which expired on the 30th of November, 1874, authorizing the corporation to increase the price of gas, and that the Board of Trade recommended that before proceeding further the council should consider whether it might not be safer to proceed by bill. The committee were of opinion that as their application for a Provisional Order had already been so far proceeded with, it was not expedient to withdraw it, and that if any doubts existed, or might be afterwards raised, as to the power of the Board of Trade to extend Provisional Orders already granted, it would be for that board to take such steps, on the meeting of Parliament, as they might consider necessary to have their powers in this matter put beyond question. At the same meeting attention was drawn to the fact that Dr. Wallace's reports upon the quality of the gas were not published in the newspapers as they had been formerly. One member of the council said the press would not publish the figures, as they did not possess any public interest. Another member objected to the spending of £200 per annum upon the analysis of the gas, as he considered there was very little got in return for the expenditure. On the other hand, however, Treasurer Miller said Dr. Wallace's analysis of the gas was very valuable, and stated that the council were most anxious to furnish the gas as good in quality as possible.

It was reported at the meeting of the Dundee Gas Commission that 3984 tons 3 cwt. of coal had been carbonized during the month of December, 1874, and that the amount of gas made during the same month was 43,180,500 cubic feet. At the suggestion of the convener and Mr. M'Crae, the manager, it was resolved to build a new chimney stack, 150 feet high, in connexion with the new retort-house and steam-boiler.

The Aberdeen Gas Commission have approved of a recommendation from the Gas Committee to erect at least 20 additional retorts, in beds of five each, with one furnace, at an estimated cost of £460. Mr. Smith, the superintendent of the gas-works, reported to the committee that he had, on the 27th ult., the whole of his 144 retorts in operation, and that the additional retorts were required in order to meet the increasing demand, and in case of any accident occurring to the others. At last week's meeting of the Aberdeen Gas Commission, the salaries of a number of the clerks in the gas office were advanced.

On Tuesday last the Forfar Gas Commission had under consideration a letter from Mr. Innes, the manager of the works, resigning his situation. The resignation was accepted, and the provost and Mr. John Laird spoke in high terms of Mr. Innes as a manager, and, on the recommendation of Mr. Laird, it was resolved to express in the minutes the high opinion entertained of Mr. Innes, and to give him an excerpt of the same.

The third annual festival of the Partick, Hillhead, and Maryhill Gas Company's *employés*, took place on Friday evening in the Burgh Hall of Hillhead, one of the suburbs of Glasgow. Including the directors, friends, *employés* and their wives, and others, there were about 300 persons present. Bailie Cowan, of Hillhead, occupied the chair, and, in the course of his address, he expressed the pleasure which it gave to him and the other directors to meet with the

employés of the company, and hoped that they would have many opportunities of meeting under similar circumstances. He said they were all familiar with the use of gas; but there was a time when no such artificial light existed. In 1658 the attention of scientific men was drawn to the inflammable material which was found to issue from wells and pits in coal districts. Then, after speaking of Murdoch applying gas to the illumination of his own house in Cornwall, in 1792, and the works of Boulton and Watt, some years later, he said that gas was introduced into some cotton-mills near Manchester in 1805, and that it was not till 1817 that the city of Glasgow was lighted with gas. It was now an indispensable thing, and he hoped that those who were concerned in the manufacture of it would be successful in their undertaking.

There are several new items of interest in connexion with water supply to put on record. The Hamilton Town Council have approved of the principle of the bill for the extension of the water-works of that town. A dividend of 9 per cent. has just been declared by the Rothesay Water Company, and negotiations are at present in progress for the acquisition of the works of the company by the Town Council.

A meeting of the manufacturers and others interested in the question of a water supply to the town of Galashiels was held a few days ago, to consider the position of the Galashiels Water Company, and it was resolved to take immediate steps towards opposing the further progress of the bill now being promoted in Parliament by the company. The Police Commissioners of Cupar are about to proceed with their new water-works, and are advertising for eligible contractors to execute the works, and to supply 11 miles of iron pipes, with valves, fire-plugs, street-wells, &c. Tenders are likewise asked by the Edinburgh Water Trustees for about 200 tons of cast-iron pipes, varying from 3 to 6 inches in diameter.

The prices of pig iron have remained pretty steady during the past week, the closing quotations on Friday being 73s. for buyers, and 73s. 3d., cash, for sellers. Makers prices have undergone no reduction. Coal rates are generally a little firmer. Fifeshire gas coal is in considerable request, at prices ranging from 19s. 10d. to 25s. 6d. at the pits.

KIRBY-MOORSIDE GAS AND WATER COMPANY.—The second annual meeting of this company was held on Monday, Feb. 1. The balance-sheet showed that, after working expenses had been met, there was a dividend available equal to 3½ per cent. The retiring directors were re-elected.

THE MUNICIPAL CORPORATIONS (BOROUGH FUNDS) ACT.—A deputation of property holders in Liverpool waited upon Mr. C. Turner, M.P., and Mr. Torr, M.P., on Tuesday last, for the purpose of asking them to oppose the agitation for the repeal of the Borough Funds Act. Mr. Torr, while admitting there was force in the arguments used, declined to pledge himself to any specific course.

BRAY GAS SUPPLY.—The price of gas supplied to the public lamps of this township has been fixed by the Alliance Company at 5s. 4d. per 1000 cubic feet. A proposal has been made to provide meters, to be attached to every fifth lamp within the district, which would entail a cost of about £100, which it is calculated would be more than counterbalanced by the prevention of waste and regulation of consumption; and a deputation has been appointed to wait upon the gas company on the subject.

WAKEFIELD WATER BILL.—A special meeting of the Normanton Local Board, and also a meeting of the ratepayers of the township, were held at Normanton on Monday week, in reference to certain provisions contained in the bill to be introduced in the coming session of Parliament by the Wakefield Water-Works Company, which it is considered may affect injuriously the interests of Normanton, so far as its water supply is concerned; and at both meetings a resolution was passed to oppose the bill.

ABERDEEN (CORPORATION) GAS-WORKS.—At the meeting of the Gas Committee on the 27th ult., Mr. Smith, superintendent of the works, reported that the whole 144 retorts were in action at present, and in case of any accident occurring, and also to meet the increasing demand for gas, he recommended that at least 20 additional retorts be erected, the cost of which he estimated at £460. The committee recommended the Town Council, at their meeting on the 1st inst., that these works be carried out, and the recommendation was adopted.

THE INSTITUTION OF CIVIL ENGINEERS.—At the tenth ordinary meeting of the session 1874-75, held on Tuesday evening, the 2nd of February—Mr. Thos. E. Harrison, president, in the chair—the paper read was "On the Origin of the Chesil Bank, and on the Relation of the existing Beaches to past Geological Changes, independent of the present Coast Action," by Professor Joseph Prestwich, M.A., F.R.S., V.P.G.S., Assoc. Inst. C.E. It was announced that the council, acting under the provisions of the bye-laws, had transferred Messrs. A. M. Fowler, borough engineer and surveyor of Salford, and Robert Vawser, engineer to the Corporation of Warrington, from the class of associates to that of members. At the monthly ballot forty-one candidates were elected, including five members, viz., Messrs. K. Bayley,—Res. Eng., Northumberland Dock Railways; R. F. Church, Westminster; Holt, Liverpool; L. W. Paynter, Ex Eng., P.W.D., Madras; and W. J. Till, borough surveyor of Birmingham; and thirty-six associates, among whom we notice Mr. W. Longworth, engineer of the Gas-Works, Dukinfield.

WEARDALE AND SHILDON WATER-WORKS COMPANY. — The half-yearly meeting of this company was held last Wednesday, when the directors report and statement of accounts was presented and passed. A dividend of 4½ per cent. per annum was declared. The retiring directors and auditor were unanimously re-elected. The chairman of the company (Mr. Henry Pease) spoke in a generally favourable manner of the prospects of the company, and said the Tunstall reservoir was progressing satisfactorily. The general increase in the demand for water was such as to warrant the company in laying as rapidly as possible the line of pipes to the districts which were included in their scheme. After the ordinary meeting a special meeting of the shareholders was held to consider the bill for extending the limits for the supply of water and for constructing additional works and raising additional capital. The resolution approving of the same was passed unanimously, and the meeting terminated.

RATS AND GAS-PIPES.—About eight o'clock on Sunday morning, the 31st ult., a woman named Mrs. Dempster went to the provision shop of Mary Hart, or M'Nab, at 15, M'Alpine Street, Glasgow, but could get no admittance. She returned several times before half-past ten, and still the door was closed. She began to suspect that something was wrong, and on informing her husband, he along with two other men went and forced the door in the close. On entering, Mrs. M'Nab with her two children, Barbara, aged seven years, and David, aged five years, were found in bed insensible, and the servant, Catherine Hughes, was found lying on the floor in a similar condition, while the premises were filled with gas. The poor people were carried off by the relieving party to another house, and Dr. Jack was called in. He applied the usual restoratives, and the children and the servant have all recovered, but Mrs. M'Nab still lies in a precarious condition. Intimation of the escape was sent to the gas office, and a plumber was sent to examine the pipes and find out where the leakage had occurred. On inspection he discovered that a large hole had been cut into the lead pipe near the meters by the rats, and that there must have been a large escape of gas. The defect was immediately remedied.—*Glasgow Herald.*

ROTHESAY WATER COMPANY.— The annual meeting of this company was held on the 1st inst.—Mr. A. Brown in the chair. The statement of the income and expenditure showed that the company commenced the year with a balance of £792 15s. 6d., and the total receipts brought up the income to £1901 8s. 8d. The expenditure amounted to £259 14s. 9d.; dividends to £817 2s.; and wages, rents, feu duties, taxes, repairs, furnishings, printing, &c., to £311 4s. 5d., leaving a balance in bank of £304 9s., and in treasurer's hands £209 9s. 6d. The annual report read showed that the revenue had been steadily increasing, that the supply of water by gravitation had been considerably improved, but would not be entirely satisfactory until the proprietors of houses getting water in this way provided cisterns; that an application for water by the Aquarium Company had not yet been complied with; that the company, at the request of Mr. Stewart, had agreed to extend its pipes to Ascog, that the application of the council for water for sanitary purposes at a decreased rate had been considered, but that the application could not be acceded to, as the amount paid by the burgh was less than paid by other corporations. The proposal of the council to buy up the company had been received, but terms had not yet been agreed to. The dividend was declared at 9 per cent. The superintendent's report showed that there had been 27 sewer extensions during the year, which had increased the number of consumers by 32, and raised the total to 2119. The plant is in a satisfactory condition, and no accident had occurred during the year.

A GAS ENGINEER'S SILVER WEDDING.—An esteemed correspondent at Copenhagen writes to us as follows:—"Many of the readers of the JOURNAL will remember Mr. Samuel Edwards, at the time he was chief superintendent of the Athol Street and Eccles Street stations of the Liverpool United Gas Company, under their celebrated engineer, Mr. Alfred King. Mr. Edwards and his wife, who were both born in England, and have lived for 18 years in Denmark—first in Flensburg, and later in Copenhagen—have just celebrated, together with their large family, the 25th anniversary of their wedding-day, and received from their many friends on this occasion warm expressions of their sincerest sympathy and esteem. Mr. Edwards, who is the head engineer of the many works belonging to the Danish Gas Company, has by his great ability and humanity gained the esteem of all his *employés*, and in order to show this in a tangible manner, the several managers of the company's gas-works presented him with a model of a gasholder in silver, which, by an ingenious mechanism, hands out cigars, and fire to light them by. The dwelling-house of Mrs. and Mr. Edwards on the occasion presented the finest winter garden, with a manifold show of camelias and other selected flowers. Silver spoons, a tea-kettle, &c., the lady friends presented to the silver-bride, and, at early morn, the band of the guards played, to their surprise, the "Bridal March," "God Save the Queen," "The Danish National Song," and "Christmas Hymn," &c.

FRODSHAM GAS COMPANY, LIMITED.—The annual general meeting of the shareholders of this company was held on Monday evening, the 1st inst., in the town-hall.—Mr. W. Hayes in the chair. The report stated that the gas-rental for the year had amounted to £749 13s. 8½d., being an increase of about £108 upon that of the previous year; one half of the increase being accounted for by the difference in the price charged for gas, and the remainder to a larger consumption. The income from other sources was £77 8s. 9d., making a total of £827 2s. 5½d. The expenditure, including interest on borrowed capital was £626 11s. 1d., leaving a balance of profit of £200 11s. 4½d.; out of this sum it had been deemed prudent to transfer £50 to the reserve-fund, which had become exhausted in consequence of recent additions to the works, the remainder, together with the balance brought forward from the last account, and amounting in the whole to £256 3s. 8½d., being available for distribution. The directors, after due consideration, recommended a dividend of 6 per cent. for the past year, leaving a balance of £136 3s. 8½d. to be carried forward; also that the price of gas be reduced 10d. per 1000 cubic feet, the reduction to take effect from the 31st of December last. On the motion of the chairman, the report was unanimously adopted, and a dividend declared in accordance with the recommendation of the directors, and a resolution passed reducing the price of gas to the extent named. The retiring directors as well as the auditors having been re-elected, a vote of thanks to the chairman brought the meeting to a close.

STREET-LIGHTING IN THE CITY OF LONDON.—At the meeting of the Commissioners of Sewers on the 2nd inst., Mr. F. Cox called attention to the experiment commenced many months ago of lighting the cross roads in front of the Mansion House by the use of a ring of jet-lights in place of the five ordinary street-lanterns previously employed there. He reminded the court that this was done so far back as the month of March, 1874, and that in September last the engineer reported to the Streets Committee that this mode of lighting would cost an alarming amount, for while the five lamp-lights cost the commission about £30 a year, the ring of jet-lights now in use would cost them about £150 a year. Although the engineer made this report so long ago, the ring of jet-lights was still used. He (Mr. Cox) was of opinion that a concentration of lights in such places as this was a very desirable thing, and produced a very good effect; but not being covered in, about half the gas was blown away, and something should be done to put a stop to such an extravagant mode of lighting. He moved that the Streets Committee be requested to consider if some improvements could not be made in illuminating such places in the City, and to take some steps in regard to the ring of jet-lights in question. Mr. R. Cox said that although this ring of light cost a great deal more than the five lamps, it gave a much better light. Mr. W. Clark said that upon a motion of his in October or November, 1873, it was referred to the committee to consider what improvement could be made in the lighting of the City, and a report was brought up on that reference, but the court took no action upon it. He thought the light near the Mansion House would be much more effective if it were divided into three parts. A new kind of lamp had been recently submitted to the Streets Committee, and he hoped the same would be the means of improving the lighting of the City. He believed an experiment was shortly to be tried with the lamp, which consisted of a large glass urn. Six of them were to be put up. The glare of light from the ring of gas-jets near the Mansion House was such that one could scarcely see where he was going to beyond it. The motion was then carried.

RATING OF THE NEW RIVER COMPANY'S SOURCES OF SUPPLY.—At the weekly meeting of the Hertford Board of Guardians, on Saturday, the 30th ult., Mr. J. D. Medcalf, a member of the board, drew attention to the amount to which the New River Company are rated in the Hertford Union to the relief of the poor. He said that when so much had of late been heard in reference to the increased expenditure, it was time to think of going into a committee of ways and means, and of seriously considering the desirability of making property which had hitherto contributed comparatively little or nothing, pay its fair proportion towards the public revenue. He found, from the report of a "Royal Commission on Water Supply," that the New River Company supplied to the metropolis no less than 35 million gallons of water per day, and that of this enormous quantity they were authorized to take at all times from the river Lea through their gauge at Hertford, no less than 22,500,000 gallons per day, whilst the average daily flow from the Chadwell Springs amounted to 3,500,000 gallons. He thought the public would be rather surprised to hear that all the company paid for this tremendous quantity of water was £1500, whilst by its sale they netted a princely fortune, as reference to their recent balance-sheet would show. By far the greater bulk of this quantity of water was taken from within the limits of the borough of Hertford, and, making full allowance for all the working expenses of the company, they must clear something like £130,000 a year from the water which they derived from this source at a cost of some £1500. In one parish—that of St. John—they were rated to the poor at £350, and in another parish—Little Amwell—they were rated at £480, making a total of £830, which they paid for so magnificent a property. The ratepayers who had the misfortune to reside in the Lea valley had been made to divert their sewage from the river at an immense outlay for the sole benefit of the New River Company. He moved—"That this board recommend the Assessment Committee to employ a competent person to revalue the property of the New River Company within the union, and that the result be reported to the board." The resolution was carried unanimously.

BODMIN GAS CONSUMERS COMPANY.—The annual meeting was held on the 1st inst.—Mr. C. P. Tonkin in the chair. The report of the directors stated that the works and plant continued in a most satisfactory state. The accounts showed a balance of £473, and the directors recommended that a dividend of 8 per cent. should be declared; that £100 of the surplus should be applied to the reserve-fund, and the remainer to the depreciation of plant. The price of gas would be reduced from 6s. 6d. to 6s. 3d. per 1000 feet, and as a discount of 6d. per 1000 feet would be allowed on all accounts paid within a month of each quarter-day, the price would practically be 5s. 9d. per 1000 feet. In their report the directors expressed their sense of the loss they had sustained by the death of Mr. G. P. Parkyn, who had been a member of the board of directors since the formation of the company. The chairman, in moving the adoption of the report, said that the directors had been put to considerable trouble during the past two or three years in getting coal, not so much from prices during the past twelve months as from the difficulty in obtaining shipments, one cargo having to be disposed of before it reached its destination, in consequence of the vessel springing a leak. The temporary failure of the supply of water from the water-works had also put them to some inconvenience in making the sulphate of ammonia, and in working the exhauster. Notwithstanding all those drawbacks, the year had been a most satisfactory one. Ten years ago the quantity of gas made was 2,735,280 feet; last year it amounted to 5,969,300 feet. Commander J. Liddell seconded the adoption of the report, which he thought a highly favourable one, and the motion was carried unanimously. Messrs. C. P. Tonkin and S. Hender were re-elected directors, and Messrs. J. R. Collins and E. T. Crabb were re-elected auditors. The chairman said the abatement of 6d. per 1000 feet on all accounts paid within a month of quarter-day worked wonders, the manager having nothing like the difficulty formerly experienced in collecting the money. Mr. Sobey proposed a vote of thanks to the directors for efficient services during the past year, and the motion was carried. Mr. Sandoe, in returning thanks, said they were particularly indebted to the acting chairman, who had been most constant in his attendance at their meetings, and was always ready to help. Commander Liddell, in eulogistic terms, proposed a vote of thanks to the manager (Mr. Thomas), who, he said, was most zealous, able, and attentive. Mr. Tonkin said it would be ungenerous in him if he did not second the vote, as he was fully aware of the value of Mr. Thomas, and quite agreed with Commander Liddell that the company were greatly indebted to him. Mr. Thomas acknowledged the vote, and the meeting concluded with a vote of thanks to the chairman.

PROTECTION OF BUILDINGS AND SHIPS FROM FIRE.—At the Society of Arts, on Wednesday last, Mr. J. A. Coleman, C.E. (U.S.A.), read a paper on this subject. He began by stating that in Great Britain and America alone the annual loss of property by fire is represented to be over 50 million pounds sterling, or something like 10s. for every man, woman, and child in both countries. He passed on to inquire why we were so powerless against fire. Engineering ability had been successfully brought to bear upon almost every other great problem, but it was evident that far less thought had been devoted to this important subject. Of late years some important improvements had been made in the substitution of steam for manual power to work our fire-engines, and in some minor details; but whilst the engines have received the assistance of a motor whose power is almost without limit, the means of conducting water to a fire remain unchanged. The effect of the engine was crippled by the hose, which, from its nature, could bear but a limited pressure. The improved engine of the present day could not throw an effective stream of water to double the height attained by the first fire-engine, constructed over three hundred years ago. All that had been gained over the old engine was the ability to throw a larger volume of water continuously to only a moderately increased height. To this extent only had the situation been improved. The theory for putting out fires, in all essential features, remained unchanged, while the difficulties of the old system had increased. What, then, was the underlying trouble with all our fires in buildings or in ships? Simply a fault of engineering. It was the failure to put a little water in the right place at the right time. It was the failure to strike a fire dead in its incipient stage. Any system, to be successful in extinguishing fire, must be capable of prompt application. It must also be able to do the least possible damage, by using the smallest quantity of water necessary to accomplish its purpose. A bucket full of water in the right place at the right time was worth more than 20 tons of water 20 minutes later. The plan he proposed was to put iron stand-pipes upon buildings, one going to the roof, and others to the separate storeys. Then perforated branch-pipes were to be laid at suitable distances apart, over the roof and under the eaves, to distribute water like a rainstorm over the entire top and sides of the building, in case heat and flames were attacking it from another edifice on fire. Perforated branch-pipes were also to be fixed upon the ceiling of each storey, in order to strike the top, sides, and floor with small jets of water. Each storey has its own stand-pipe and valve, or cock, the latter being operated from the side-walk. All the cocks were intended to be placed in an iron box let into the wall of the building, always locked to prevent tampering with by improper persons. By this apparatus it would be seen every square foot of the exterior and interior of a building could be commanded under all circumstances by a man quietly manipulating the proper valves from the side-walk, without the necessity for going near the danger. If there should be a sufficient head of water, the distributing apparatus described would be connected directly with the mains in the street, and its control placed in the hands of the city authorities. Should there not be a sufficient head of water, there must be steam-boilers and pumps. For ships he would have a somewhat similar apparatus. A ship of 1200 tons could be fitted with his apparatus for £300, and by it all danger of fire at sea would be avoided. The ventilation of ships he would effect by the use of compressed air and perforated pipes, which would diffuse the introduced air all over the interior space to be ventilated. The principle had already been carried out successfully in the Mount Cenis Tunnel. The use of steam as a means of extinguishing fires he had ascertained, by experiment, to be an expedient of doubtful efficacy. In the brief discussion that followed, the lecturer was complimented on the ingenuity of his plans, but some doubts were expressed as to their being so applicable to European as they were to American buildings, also as to whether their expense would not be an obstacle to their introduction.

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

360.—LAMBERT, C., Hull, "Improvements in filters or apparatus intended chiefly to clear rain water during its flow from roofs to reservoirs." Jan. 30, 1875.

378.—BUCKLEY, J. B., and STOCK, E., Oldham, "Improved double and single sealing stench-traps." Feb. 2, 1875.

396.—ATHERTON, J., Euston Road, London, "Improvements in joints or couplings for pipes or tubes." Feb. 3, 1875.

399.—RYDILL, G., Chancery Lane, London, "Improvements in the process of and apparatus for treating and purifying sewage and polluted waters, which improvements are applicable for collecting the soap, grease, and oils for the manufacture of gas, and for removing incrustations in steam-boilers." Feb. 3, 1875.

400.—JOHNSON, R., Bradford, "Improvements in machinery for obtaining motive power for raising, forcing, and exhausting fluids and liquids, and for measuring liquids." Feb. 3, 1875.

417.—CHAMEROY, E. A., Paris, "Improvements in cocks for water, steam, air, or gases." Feb. 4, 1875.

425.—CROMBIE, E. E., Euston Road, London, "Improvements in dry gas-meters." Feb. 4, 1875.

430.—PORTER, G., Cullum Street, London, "Improvements in gas-burners." Feb. 4, 1875.

GRANTS OF PROVISIONAL PROTECTION.

67.—BOYMAN, R. B., Clapham Park, Surrey, "Improvements in rotary engines moved by the expansive power of fluids, in the means of giving them such power, and in the machinery and application of the same." Jan. 7, 1875.

265.—MILLS, E. C., and HALEY, H., Gorton, Lancs, "Improvements applicable to motive-power engines worked by the explosion of gas." Jan. 23, 1875.

268.—GILL, D., Weston-super-Mare, "An improved method for neutralizing the poisonous and offensive nature of sewer or drain gas, and to deodorize the sewage." Jan. 25, 1875.

269.—ALLEN, W., Manchester, "Improvements in machinery for raising and forcing fluids and liquids." Jan. 23, 1875.

272.—POTTS, J. C., Handsworth, Staffs, and DARNELL, D. C. W., Edinburgh, "Improvements in apparatus for ventilating water-closets, lavatories, bath-rooms, sinks, and other structures and appliances connected with sewers." Jan. 23, 1875.

286.—CORY, E., Cardiff, "Improvements in motive-power engines, also applicable to pumps or measures for air, gases, or liquids." Jan. 25, 1875.

294.—CANNON, W., London Road, Southwark, "An improved cup and ball joint for gas pendants and chandeliers." Jan. 26, 1875.

NOTICES TO PROCEED.

3240.—MALAM, W., Forest Hill, Kent, and GRAVES, T., Lavender Hill, Surrey, "Improvements in apparatus for mixing air with the vapour of liquid hydrocarbons to be used for lighting and heating or for any other purpose, also in the treatment of such hydrocarbons with a view to purifying the same and obtaining a useful product therefrom." Sept. 22, 1874.

3269.—SPICE, R. P., Westminster, "Improvements in apparatus used in the manufacture of gas." Sept. 24, 1874.

3287.—FURNESS, G., Heaton Norris, Lancs, "Improvements in the construction of cocks and valves for controlling the flow of liquids and fluids." Sept. 25, 1874.

3304.—WHITE, M. G., Landport, Hants, "Improvements in self-acting apparatus for regulating the supply of water or other liquids." Sept. 26, 1874.

3687.—HOLMAN, S., Laurence Pountney Lane, London, "Improvements in apparatus used in the manufacture of gas." Oct. 26, 1874.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

GWYNNE & BEALE'S PATENT IMPROVED GAS-EXHAUSTERS,

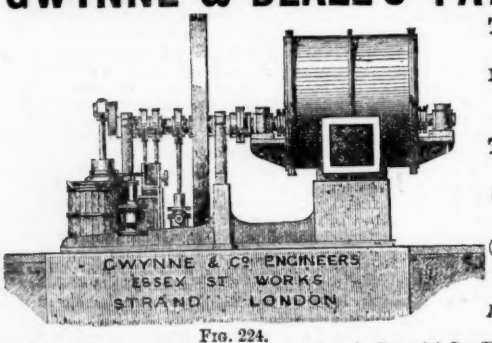


FIG. 224.

The BEST EXHAUSTERS IN THE WORLD.

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of

GAS-EXHAUSTING MACHINERY.

(It is NOT CORRECT to state that Mr. BEALE has RETIRED.)

Prices and every information on application.

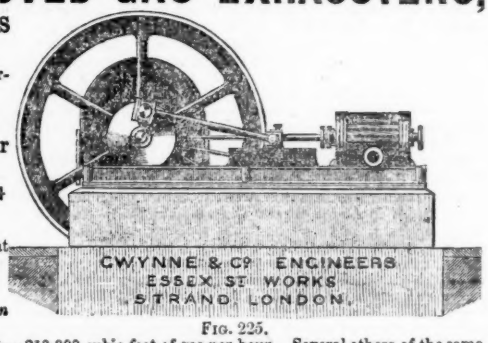


FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

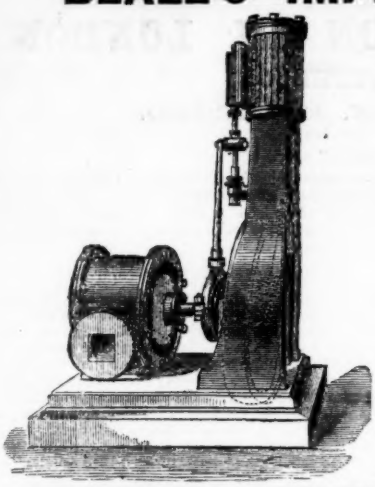
REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,

CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 *cubic feet Patent Gas Exhausters, and many of all sizes.*

BEALE'S IMPROVED PATENT GAS-EXHAUSTER

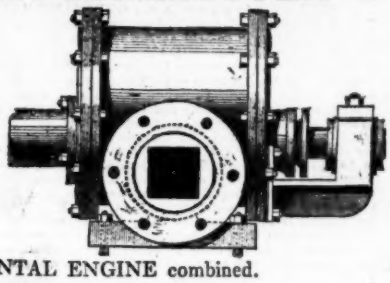


WITH

ENGINE COMBINED

ON

ONE BASE PLATE.



SOLE MAKERS,

GEORGE WALLER & CO.,

Who, since Mr. BEALE'S retirement, are the Oldest Makers.

EXHAUSTERS with HORIZONTAL ENGINE combined.
EXHAUSTERS with OUTSIDE BEARINGS.
MAKERS of ENGINES, BOILERS, and GAS MACHINERY.
TAR, LIQUOR, and SYPHON PUMPS. GAS-VALVES in stock, 2 to 30 inches.
SELF-ACTING BYE-PASS VALVES, with Lid and Relieving Lever.
MANN'S and many other descriptions of WATER DISTRIBUTORS.
SCRUBBERS, PURIFIERS, and CONDENSERS.
EXHAUSTERS from 3000 to 60,000, new and second hand, in stock.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, S.E., & at STROUD, GLOUCESTERSHIRE.

Now ready, price 18s., bound in cloth, lettered,

THE TWENTY-FOURTH VOLUME

(JULY TO DECEMBER, 1874)

OF THE

JOURNAL OF GAS LIGHTING, WATER SUPPLY, AND SANITARY IMPROVEMENT.

CLOTH CASES, GILT LETTERED,

For binding Vol. XXIV., may now be obtained, Price 2s. 6d.

TERMS OF SUBSCRIPTION.

The JOURNAL OF GAS LIGHTING is supplied direct from the Office to residents, in any part of the United Kingdom, at the rate of 21s. per annum, payable in advance. If credit be taken, the charge is 25s.

Halfpenny stamps may be forwarded for amounts under 5s. Any larger sum should be remitted by Money Order, payable at the General Post Office, to William B. King.

CHARGES FOR ADVERTISEMENTS.

Six lines (about 40 words) or under . . . £0 3 0
Each additional line (about 8 words) . . 0 0 6

Special Terms for Continuous Advertisers.

The insertion of Advertisements in the current week's issue cannot be guaranteed unless received at the Office by THREE o'clock p.m. on MONDAY.

The Publisher cannot be responsible for Testimonials, accompanying replies to Advertisements, left at the Office, and strongly recommends that *copies only* should be sent.

LONDON:

WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, E.C.

Now ready, price 7s., by Post 7s. 3d.,

A SECOND EDITION (fcap. 8vo., morocco gilt)

OF

THE GAS MANAGER'S HANDBOOK;

CONSISTING OF

Tables, Rules, and Useful Information for Gas Engineers, Managers,

And others engaged in the Manufacture and Distribution of COAL GAS.

BY THOMAS NEWBIGGING, A.I.C.E.

WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

For Companies to issue to their Gas Consumers.

ADVANTAGES OF GAS

FOR

COOKING AND HEATING.

(NEW EDITION.)

By MAGNUS OHREN, A.I.C.E., F.C.S.

Specimen Copy by post Threepence, direct from MAGNUS OHREN, GAS-WORKS, Lower Sydenham, London, S.E.

WANTED, a young Man who can test and adjust wet and dry Gas-Meters.

Apply, by letter, to JOHN BENT AND SON, Gas-Meter Manufacturers, Bell Barn Road, BIRMINGHAM.

WANTED, a second-hand Purifier, 9 ft. square, without valves or connexions. Purifier and cover must be in good condition.

Apply, by letter, to No. 122, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, second-hand, by the Kidsgrove Gaslight Company, EXHAUSTER, to pass 10,000 cubic feet of gas per hour; 4-horse power Engine for same, Governor, Throttle-Valve, and all necessary connexions. Must be in perfect condition. One Purifier, 8 ft. by 6 ft., or 8 ft. square.

WANTED, by a Contractor, good Men, able to take charge of erection of Purifiers, Scrubbers, general cast-iron work and connexions. Constant employment.

Apply, stating wages required, age, experience, &c., to No. 131, care of Mr. King, 11, Bolt Court, Fleet Street, LONDON, E.C.

WANTED, a steady Man for a small Gas-Work. A competent stoker will find this a good opening.

Applications, with testimonials from last employers, to be made, on or before the 16th of February, to the SECRETARY, Rothwell, near KETTERING.

TO GAS COMPANIES—ENGLISH OR FOREIGN.

WANTED, by a strong, steady, and thoroughly experienced Man, a situation as an INSPECTOR, or Foreman of Fitters. Can give 14 years reference to one of the largest Gas Companies in London.

Address G. P., 19, Charles Place, Hertford Road, KINGSLAND, N.E.

WANTED, an engagement as Assistant MANAGER, or Superintendent of a Gas-Work, by one who has received an Engineer's and Chemical Education. Thoroughly understands the manufacture and distribution of gas, having held the same post before on large and small works.

Address No. 132, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BOROUGH OF LEEDS.

GAS ENGINEER.

WANTED, by the Council of this Borough, a competent person to take full charge of the Gas-Works. He must possess the requisite qualifications of a thoroughly practical Engineer; be capable of preparing plans and superintending the construction of works; and have a sound knowledge of the manufacture and distribution of gas, and of chemistry as applied to its manufacture and purification. The salary offered is £500 per annum.

Applications, with testimonials, to be sent on or before the 1st day of March next, addressed to the undersigned, and endorsed "Gas Engineer." The person appointed will be required to devote the whole of his time to the duties of the office. Any candidate personally canvassing members of Council will be disqualified.—By order,

CAPEL A. CURWOOD, Town-Clerk.

Leeds, Jan. 22, 1875.

Price 1s., by post 1s. 2d.,

RETORT SETTING AND WORKING, an Illustrated Pamphlet, by E. S. CATHELS.

London: W. B. KING, 11, Bolt Court, FLEET STREET, E.C.

BOROUGH OF BARROW-IN-FURNESS—GAS AND WATER DEPARTMENT.

WANTED, Gas and Water Main and SERVICE LAYERS. None but good, steady, and experienced workmen need apply.

Applications, stating wages required, with testimonials, may be sent to, or further information obtained from, JOHN LEWIS, Manager, &c.

WITHOUT SALARY.

WANTED, an appointment as Assistant to a Manager of a Gas-Work, without salary, but must reside with the Manager, and would pay a reasonable sum for board and lodging. Is over 21 years of age. Has thoroughly learnt the duties of an Inspector, and has had three years experience as a pupil on a small Gas-Work.

Address No. 127, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FORFAR GAS-WORKS.

WANTED, by the Forfar Gas Corporation, a competent and experienced GAS MANAGER, to take charge of the above works, the present make of which is about 17,000,000 cubic feet of gas per annum. The duties include the making out and collecting of the accounts for gas-rates and others. Salary to commence with £110 per annum, with house, coal and gas, and all taxes paid. The house is comparatively new and most commodious. Security and immediate entry will be required.

Applications, with testimonials, endorsed "Manager," to be lodged with WILLIAM GORDON, Solicitor, Clerk to the Corporation, on or before Thursday, the 18th of February current.

Forfar, Feb. 3, 1875.

SUPERINTENDENT OF GAS-FITTERS.

THE Directors of the Birmingham Gas-light and Coke Company require a competent SUPERINTENDENT for their Fittings Department.

Applications, by letter only, stating age, qualifications, and salary expected, to be addressed to the SECRETARY, at the Offices, 23, UNION STREET, not later than the 10th of February.

FOR SALE, in good condition, three 20-light WET METERS, and six 10-light Wet Meters. No reasonable offer refused.

Apply to Mr. S. DAWES, Gas-Works, CLEVEDON.

FOR SALE—Gas Apparatus, comprising three Gasholders, respectively about 2500, 500, and 100 cubic feet capacity, in wrought-iron tanks; one horizontal coil Condenser; two circular Purifiers; wrought-iron Hydraulic Tanks; sundry Retorts and Retort Mouthpieces; experimental Station-Meter; Photometric and Chemical Test Apparatus; sundry other apparatus, pipes, fittings, tools, wrought and cast scrap iron, old fire and stock bricks, &c.

For full particulars, apply to W. H. BECK, 139, CANNON STREET, E.C.

TO GAS APPARATUS MANUFACTURERS AND OTHERS.

TO BE DISPOSED OF, the Rights and Privileges granted under Letters Patent to Mr. W. Box for his "Anti-Dip Valve;" also similar Rights and Privileges, under Letters Patent, for his "Ascension-Pipe Joints." These valuable Inventions may be acquired at a very moderate sum, or the Patentee would be happy to enter into an arrangement with a manufacturer for making and introducing the articles upon mutually advantageous terms.

Address Mr. W. H. BENNETT, 42, Parliament Street, WESTMINSTER, S.W.

SULPHATE OF AMMONIA AND TAR DISTILLING APPARATUS FOR SALE.

THE whole of the requisite apparatus for working up the Tar and Liquor from Gas-Works carbonizing about 6000 or 7000 tons of coal per annum, to be SOLD, a bargain.

The apparatus consists of Tar and Liquor Stills, each capable of working 1000 gallons each charge. Saturator, Washing and Draining Tables lined with lead. Small Steam Boiler and 2-h.p. Engine, nearly new. Acid and Lime Washing Vessels, Coil Box, and small Still, with all necessary pipes and connexions.

Further particulars, with price, may be obtained, on application, by letter, to No. 130, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

MESSRS. JOHN BETHELL & CO.,

(ESTABLISHED 1836,)

CONTRACTORS for GAS TAR,

MAKERS OF ANTHRACENE, CREOSOTE, &c.,

CLAYTON CHEMICAL WORKS, MANCHESTER;

SWAN VILLAGE, WEST BROMWICH.

Head Offices: 38, KING WILLIAM STREET, LONDON BRIDGE.

IMPERIAL GASLIGHT AND COKE COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY GENERAL MEETING of the PROPRIETORS of this Company will be held at No. 33, John Street, Bedford Row, London, on FRIDAY, the 26th of February next, at One o'clock precisely, to receive the Report of the Directors and the Accounts of the Company, and to declare a Dividend for the half year ending the 31st of December last; to elect four Directors and one Auditor in the room of those retiring from office by rotation, but who are eligible for re-election, and will offer themselves accordingly, and for other business of the Company; and further NOTICE is hereby given that a Special General Meeting of the Proprietors will be held at the same address immediately after the above Meeting, for the purpose of considering and, if so determined, of approving the following Bill, for which application is intended to be made to Parliament in the present session; that is to say, "A Bill to authorise the Imperial Gaslight and Coke Company to raise more money and amalgamate with certain of the Metropolitan Gas Companies and for other purposes."

By order, HARRY CHUBB, Secretary.

Offices of the Company, Nos. 33 and 34, John Street, Bedford Row, London, Jan. 29, 1875.

RATCLIFF GASLIGHT AND COKE COMPANY.

OFFICES, 345, CABLE STREET, LONDON, E., Feb. 8, 1875.

NOTICE is hereby given that a HALF-YEARLY GENERAL MEETING of the SHAREHOLDERS of this Company will be held at the Company's Offices, as above, on FRIDAY, the 26th day of February inst., at Two o'clock in the afternoon precisely, to declare a Dividend for the half year ended December 31st, 1874; to elect a Director in the place of John Blacket Gill, Esq., who retires by rotation, but, being eligible for re-election, offers himself accordingly; to elect an Auditor in the place of Charles Thomas Blackman, Esq., who retires by rotation, but, being eligible, offers himself for re-election; and for other general purposes of business.

And NOTICE is hereby further given that the register of transfers will be closed from the 20th of February inst. to the 26th of February inst., both days inclusive.

By order of the Board,

H. J. BADDELEY, Secretary.

THE MITCHAM AND WIMBLEDON DISTRICT GASLIGHT COMPANY.

INCORPORATED BY ACT OF PARLIAMENT.

NOTICE is hereby given that the SIXTEENTH ORDINARY HALF-YEARLY GENERAL MEETING of the SHAREHOLDERS of this Company will be held in the Board Room at the Works, Mitcham, in the County of Surrey, on TUESDAY, the 23rd day of February, 1875, at Seven o'clock in the evening, precisely, to declare a Dividend for the half year ending the 31st day of December, 1874, and to elect two Directors and one Auditor, and for general business.

The Directors who retire by rotation at this meeting are Messrs. James Bridgen and James Poole Wagstaff, who, being eligible, offer themselves for re-election.

The retiring Auditor is Mr. Edward Sandell, who, being eligible, offers himself for re-election.

The Transfer Books will be closed from the 9th until the 23rd inst.

By order,

BENJAMIN GREEN, Secretary and Manager.

Mitcham, Feb. 3, 1875.

LOUGHBOROUGH GAS COMPANY.

THE Directors invite Tenders for the purchase of the GAS TAR and AMMONIACAL LIQUOR manufactured at their works, in quantity per year of about 180 tons of Tar and 250 tons of Ammonia Water (6° Twaddel), for a term not exceeding Two years, from the 1st of July next.

The Tar and Water will be pumped by the Company into an elevated tank for convenience of loading.

Tenders to be at a price per ton of 2240 lbs. in each case, and payment to be made seven days after each quarter-day.

Tenders to be addressed to me not later than the 27th of the present month.

J. B. BALL, Engineer and Manager.

TO PIPE-FOUNDERS.

THE Gas Management Committee of the Hereford Corporation require TENDERS for the supply of about 130 tons of Cast-Iron PIPES, with turned and bored spigot and socket joints. To be delivered free at the Hereford Railway Station or Canal Wharf.

Specification and conditions may be obtained on application to the undersigned.

Tenders, endorsed "Tender for Pipes," to be addressed to the Chairman of the Gas-Works Management Committee, Gas-Works, Hereford, and delivered not later than Ten o'clock a.m., on Tuesday, the 9th day of March.

The Committee do not bind themselves to accept the lowest or any tender.

WILLIAM DAVIS, Engineer.

Gas-Works, Hereford, Feb. 1, 1875.

THE Local Board for the district of Atherton, Lancashire, are prepared to receive TENDERS for the supply, fixing, and completing of Four Dry Lime PURIFIERS, each 12 ft. square by 4 ft. 6 in. deep, with 12-in. connexion-pipes, dry centre-valve, and lifting apparatus.

Also Two Wrought-Iron SCRUBBERS, 18 ft. high by 5 ft. diameter, with 12-in. inlet and outlet connexion-pipes complete.

Drawings and specifications may be seen at the Gas-Works, Atherton, on application to the undersigned.

Sealed tenders for the above, together or separately, and endorsed "Tender for Purifiers, &c.," may be delivered to me not later than Friday, the 26th day of February instant.

No allowance for tenders, nor do the Board bind themselves to accept the lowest or any tender.

By order,

DANIEL SCHOFIELD, Clerk.

Atherton, near Manchester, Feb. 6, 1875.

CAFFALL, THOMAS, & CO.,

LIMITED,

Patentees and Manufacturers of the

IMPROVED MOVEABLE SEAL FOR DIP-PIPES,

Now used with great success at numerous gas-works throughout the kingdom.

Testimonials and Prices on application.

OFFICES:

28, GRACECHURCH STREET, LONDON, E.C.

Price Three Shillings,

GAS PURIFICATION IN LONDON.

By R. H. PATTERSON.

SECOND EDITION, ENLARGED.

"THE LANCET."

"Mr. Patterson has laid the gas consumer under considerable obligations. His process of purifying gas entirely by means of the ammonia contained in it is at once ingenious, effective, and economical. The treatise before us examines the whole question of the Gas Purification of London in detail, and, as a contribution to the final settlement of the 'Sulphur question,' is worthy of its author's well-known powers of painstaking research and lucid exposition."

Mr. G. LIVESEY, *President of the British Association of Gas Managers*, 1874.

"It was not until the Sulphur Question was brought so prominently into notice by the difficulty experienced at Beckton, that the important part played by carbonic acid as an obstructive was made clear; and for this knowledge, I think, we are indebted to Mr. Patterson, who, at a time when all the engineers and chemists were fairly puzzled, by much thought and labour was led to the conclusion that the presence of carbonic acid was the cause of the failure to effectually reduce the sulphur compounds where lime was used; and what was better, Mr. Patterson, in an official report, stated the things so clearly that no one has since pretended that there is any difficulty in reducing the sulphur compounds where the purifiers are of sufficient extent, and it is possible to use lime. . . . It is well known that the presence of carbonic acid in the gas diminishes the illuminating power; it is therefore worth while, *on that ground alone*, to remove it. I can state that while using nothing but Newcastle coal from the Holmside Colliery during the past three months, without a particle of cannel, the gas has never been below 16 candles, and has averaged 16·5 candles."—*Inaugural Address.*

Mr. GEORGE ANDERSON.

"I believe that we are approaching an era when all the gas will be purified without Lime Purifiers. . . . I have read one or two pamphlets which Mr. Patterson has published; and I am bound to say—in the absence of that gentleman, and premising that I have never seen him—that I believe that Mr. Patterson understands more about the purification of gas than any one present does."—*Proceedings of the British Association of Gas Managers*, 1874.

"There can be no doubt that Mr. Patterson improved the purity of the gas at Beckton, as evidenced by the great diminution of Sulphur in the gas subsequent to his instructions being carried out. . . . Mr. Patterson seems a gentleman who, had he been thrown upon a desert island—I do not mean the Isle of Dogs, or down in Beckton vicinity, but anywhere else—would have found out the true way to purify gas."—Mr. ANDERSON in the JOURNAL OF GAS LIGHTING, *Nov.* 4, 1873.

"THE JOURNAL OF GAS LIGHTING."

"The hand of a skilled chemist is seen in these parts of the invention, and, whether the processes have been actually tried and found effective or not, they seem to us to promise well. The Soda and Sulphide of Sodium washing certainly merit a trial."—*Dec.* 3, 1872.

"We should rejoice to see the use of lime superseded, on account of its expense, as well as the possibility of a nuisance. The success of Mr. Patterson's process of scrubbing with solutions of alkaline sulphides would solve the difficulty at once; and *comparatively unimportant additions to, or alterations of, the present plant would secure complete purification, without offence in any locality.*"—*April* 8, 1873.

"Mr. Patterson is the first who proposed to purify gas by scrubbing with Soda and Sulphide of Sodium Solutions, a process which we believe would be found effective and cheap, and unproductive of nuisance."—*Oct.* 7, 1873.

"Mr. Patterson's processes designed for urban gas-works"—*i.e.*, by Gas Liquor and Soda and Sulphide of Sodium Solutions—"have never been applied on a manufacturing scale, although we have little doubt they might be used with perfect success."—*Sept.* 8, 1874.

"A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS."

"This more perfect means of purification demands *an entire reversal of the operations.* . . . Even when oxide of iron is used, and when it is desirable to obtain only a reasonably perfect purification, *this process is* INDISPENSABLE."—JOURNAL OF GAS LIGHTING, *Dec.* 1, 1874, *p.* 727.

WILLIAM BLACKWOOD AND SONS, EDINBURGH AND LONDON.

ALFRED WILLIAMS,

PHŒNIX FIRE-BRICK WHARF,

64, BANKSIDE, SOUTHWARK, LONDON, S.E.

GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,

AND FOR THE

SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,

AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

LIME SUPERSEDED

IN THE

PURIFICATION OF ILLUMINATING GAS

BY

SPENCE'S PATENT DRY COPPERAS.

The only purifying material which removes by one process, without injury to the purifiers, all Ammonia and Sulphuretted Hydrogen. It has been in use for upwards of five years at some of the largest Gas-Works in the Kingdom.

TESTIMONIALS SENT ON APPLICATION TO

SPENCE BROTHERS CHEMICAL COMPANY, LIMITED,

VICTORIA CHEMICAL WORKS, BRADFORD, MANCHESTER;

SOLE MANUFACTURERS OF SPENCE'S PATENT DRY COPPERAS,

SPENCE'S PATENT GAS DEODORIZER, AND MUDIE'S DISINFECTANT;

MANUFACTURERS OF

SULPHATE OF AMMONIA, VITRIOL, COPPERAS, &c.;

PURCHASERS OF SPENT OXIDE AND AMMONIACAL LIQUOR, AND CONTRACTORS FOR THE PURIFICATION OF COAL GAS.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

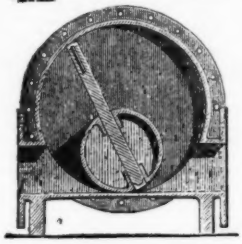
NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

TRADE MARK. J. BEALE'S PATENT GAS EXHAUSTER.



BEALE'S CONTINUOUSLY ACTING

GAS EXHAUSTERS

ARE NOW MANUFACTURED BY

B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.

B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.

Estimates and Prices on application to

B. DONKIN & CO.,

ENGINEERS & IRONFOUNDERS,

BERMONDSEY, LONDON, S.E.

TO GAS COMPANIES, ENGINEERS, CONTRACTORS, AND OTHERS.

GEORGE NEWTON,

UNION STREET WEST, OLDHAM,

BRASS FOUNDER AND FINISHER,

MANUFACTURER OF

IMPROVED WET AND DRY CONSUMERS GAS-METERS,

LAMP METERS AND BOXES,

GOVERNORS, GAUGES, INDICATORS, EXHAUST & PRESSURE REGISTERS,

GAS STATION-METERS,

With all the joints planed.

TERMS, &c., ON APPLICATION.

SAM. CUTLER & SONS,

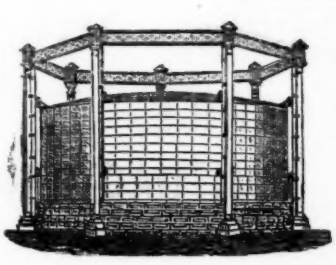
CONTRACTING GAS ENGINEERS,

GASHOLDER & GENERAL GAS APPARATUS MAKERS,

MANUFACTURERS OF

BOILERS, IRON ROOFING, IRON BRIDGES,

AND GENERAL IRONWORK.



S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works**, for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs**, and every description of **Apparatus** for the Manufacture and Distribution of Gas.

Special attention is invited to their **"Improved Condenser,"** which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers**, and **Purifiers**, of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves.**

WORKS FOR THE SUPPLY OF

VILLAGES, MANSIONS, FACTORIES, &c.

S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas and Water**, and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.

SOLE MAKERS OF BRETT'S PATENT COKE BARROW.

Experienced Retort Setters sent to any part of the Kingdom.

Address: PROVIDENCE IRON-WORKS, MILLWALL, LONDON.

BIRMINGHAM GASLIGHT & COKE COMPANY.

THE Directors invite Tenders for the purchase of the GAS TAR produced at their Works, in quantity about 5000 tons per annum, for a term not exceeding Three years from the 1st of July next.

The Tar will be delivered free into the purchaser's boats at the Company's Works.

Tenders, which must be at a price per gallon, or per ton of 200 gallons, for monthly cash payments, to be delivered to the Secretary not later than Wednesday, the 24th of February next, endorsed "Tenders for Gas Tar."

The Directors do not bind themselves to accept the highest or any Tender, and may require reasonable security for due fulfilment of the Contract.

Any further information may be obtained on application to the Chief Engineer, Mr. Charles Hunt, at the Gas-Works, Windsor Street.

By order of the Directors,

JOSEPH SLOCOMBE, Secretary.

Offices: 23, Union Street, Birmingham,
Jan. 18, 1875.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.

South Shields. W. J. WARNER.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000.

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine: (4) Turret Clock, &c.; (5) Electric Telegraph, A B C Instruments, Bells, and Apparatus.

J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

Mr. NORWOOD EARLE,

GAS SURVEYOR,

12, QUEEN VICTORIA STREET, E.C.,

Advises on all matters connected with the Distribution of Gas, Public Lighting, Gas Testing, &c.

Valuations made for Assessment and other Purposes.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

WM. RICHARDS,

INVENTOR OF THE DRY GAS-METER,

REVISER OF "HUGHES ON GAS-WORKS,"

CONSULTING GAS ENGINEER,

Advises on all matters of business connected with Gas lighting. Furnishes Working Drawings of Retort-Settings, pecification of Works, complete or in detail.

17, BURTON ROAD, BRIXTON, LONDON, S.W.

GAS COMPANIES ACCOUNTS.

EDWARD SANDELL,

PUBLIC ACCOUNTANT,

The Projector of the Gas Companies Analyzed Expenditure Account Book, having had twenty years experience in opening, keeping, auditing, and investigating Gas Companies Accounts, offers his services for similar purposes, and also in preparing Financial and Statistical Accounts for Arbitrations or Parliamentary Applications. References to numerous Gas Companies and the most eminent Consulting Gas Engineers.

4, Skinner's Place, Queen Victoria Street, LONDON.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 42, Parliament Street, WESTMINSTER.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, LONDON, E.C.

WATER-MAINS.

COTTERILL'S PATENT STEEL TUBE-DRILLS, for connecting services to water-mains, *under pressure*, without turning off the water. They drill and tap themselves, and are left in the mains. Made of all sizes, from ¾ to 2 inches and upwards. They cost less than the ordinary plan.

Apply to CHARLES FORSTER COTTERILL, Cannock, STAFFORD, Patentee.

THOMAS ALLAN & SONS, of Springbank Iron-Works, Glasgow, manufacture small cast-iron GAS AND WATER PIPES, 1½ to 6 inches, at their branch works, Stockton-on-Tees, and have at present a large stock, which they are open to sell at moderate prices.

OXIDE OF IRON.—We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.
FRANCIS RITCHIE & SONS,
BELFAST.

GARSIDE'S IMPROVED REGISTERED TUBE-VICE, holds all sizes of Wrought-Iron and Brass Tubes, from a 2-in. socket to the smallest brass tube made.

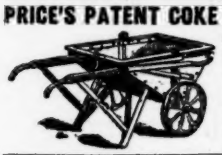
GARSIDES IMPROVED MAIN DRILLING CLIP, made in two sizes, to drill from 2-in. to 6-in. Mains, and from 6-in. to 12-in. Mains.
The above tools are made light and handy.
For drawings, &c., apply to the maker, SAMUEL GARSIDE, Gatefield Iron-Works, ASHTON-UNDER-LYNE.

PATENT FUEL AND LIME FOR PURIFYING FROM FOUL LIME.
By a simple process the Foul Lime is converted into Fuel, by the combustion of which the lime is reproduced as a purifying agent.
Licences to work the invention will be granted to Gas Companies on very reasonable terms.
For further particulars apply to Mr. E. MADDOCKS, Manager of the Gas-Works, KETTERING.
The adoption of the above invention, without a licence from the Patentee, will be an infringement of the patent, and will subject the person or company guilty of such infringement to legal process.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Agent in London, Mr. J. MANWARING, 101 Cannon Street E.C.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20 & 22, WHARF ROAD CITY ROAD, LONDON, N.,
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.
N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. CHARLES HORSLEY, Agent.

THOMAS LAMBERT & SONS
MANUFACTURE EVERY DESCRIPTION OF
GAS AND WATER FITTINGS;
ALSO,
WROUGHT-IRON TUBES & FITTINGS.
SHORT STREET, LAMBETH, LONDON.

PRICE'S PATENT COKE & COAL BARROW.

effecting a great saving of time, labour, and expense.
For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

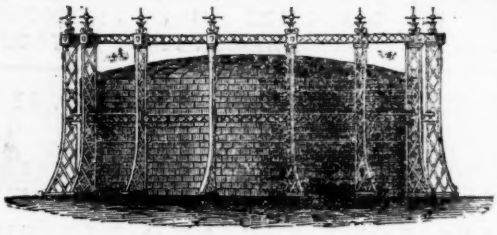
BELGIAN CLAY RETORTS.
J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

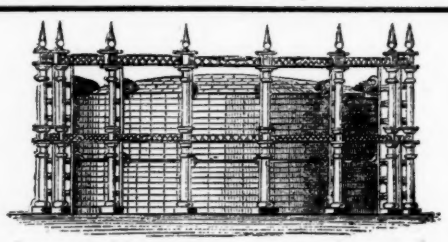
FIRE-CLAY RETORTS.
WILLIAM FRASER,
INVERKEITHING,
Owner of the Works at which Fire-Clay Retorts were first made), can supply
RETORTS, FIRE-BRICKS, &c.,
to any extent.
References can be given to managers of above a hundred Gas-Works whom he supplies.
He ships at Charlestown his
CELEBRATED HALBEATH STEAM COALS,
on Navy List.

JAMES NEWTON & SONS.
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

TO GAS COMPANIES AND THE TRADE.
J. DEFRIES & SONS,
MANUFACTURERS OF
CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, VESTIBULE LAMPS, AND THE PATENT CRYSTAL ILLUMINATION.
A LARGE STOCK ALWAYS IN HAND OF
IRON, BRASS, COMPOSITE, AND LEAD TUBES, FOR GAS AND WATER,
AND EVERY DESCRIPTION OF
GAS AND WATER FITTINGS.
THE PATENT DRY AND WET METER, WITH THE LATEST IMPROVEMENTS.
STREET LAMPS AND COLUMNS IN GREAT VARIETY.
WORKS: LONDON AND BIRMINGHAM.

GAS MOONS,
Cut and Engraved, of the newest designs
GAS REFLECTORS
In Silver and Glass
GAS NIBS
AND
BURNERS
Of every description.
Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1873, are now complete.
City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.
ESTABLISHED 1830.


THE HORSELEY COMPANY,
LIMITED,
TIPTON, STAFFORDSHIRE.
LONDON OFFICE:
6, WESTMINSTER CHAMBERS, VICTORIA STREET,
GAS ENGINEERS, IRONFOUNDERS, &c.,
MANUFACTURERS OF
GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,
AND ALL REQUISITES FOR EITHER
GAS OR WATER WORKS;
ALSO
MAKERS OF ROOFS, BRIDGES, &c.

HOPE IRON WORKS,

STOCKTON ON TEES.

ASHMORE & WHILE,
GAS ENGINEERS & CONTRACTORS,
MANUFACTURERS OF GASHOLDERS,
GAS APPARATUS OF EVERY DESCRIPTION,
Including Improved
Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,
And GENERAL IRONWORK.
N.B.—Estimates for all Gas Plant and Remodelling supplied on application.

J. & J. BRADDOCK,

GAS ENGINEERS,

GLOBE METER-WORKS, OLDHAM,

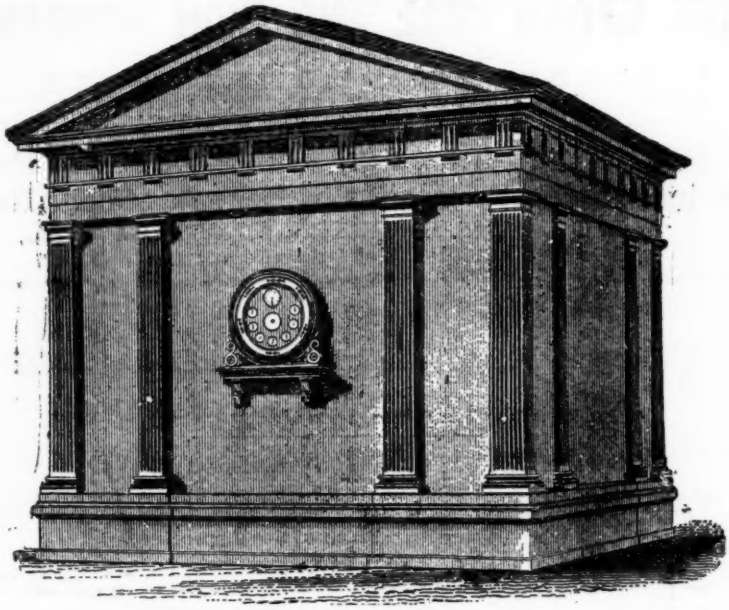
MANUFACTURERS OF

WET & DRY CONSUMERS GAS-METERS

OF THE HIGHEST EXCELLENCE;

ROUND STATION-METERS,

ON CAST-IRON STANDS.



SQUARE STATION-METERS,

WITH PLANED JOINTS.

GOVERNORS, GAUGES, INDICATORS, MAIN COCKS, &c.

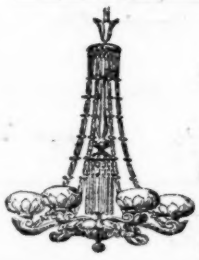
GAS COOKING APPARATUS.

Home and Foreign Orders promptly attended to.

All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.

Orders almost invariably despatched on the day of receipt.

TERMS, &c., ON APPLICATION.



F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

4, CANNON ROW, PARLIAMENT STREET, S.W.

MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.

STEAM-ENGINES and EXHAUSTERS, separately or combined.

FOUR-WAY VALVES, one of which is equal to three ordinary Valves.

STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains Illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

ADDISON POTTER,

WILLINGTON QUAY,

NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of

CLAY RETORTS, FIRE-BRICKS, AND EVERY DESCRIPTION OF FIRE-CLAY GOODS

THOMAS CARR & SON,

MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,

SCOTSWOOD FIRE-BRICK WORKS,

NEAR

BLAYDON-ON-TYNE.

EMILY GIBBONS,

Dibdale Fire-Clay Works & Colliery,

Near STOURBRIDGE.

(ESTABLISHED 1834.)

MANUFACTURER OF EVERY DESCRIPTION OF

Burs, Lumps, Stays, Shields, Blast Furnace and other Bricks & GAS-RETORTS.

Red and Blue Clay Goods, Engineering and other Ironwork, and Fittings supplied.

N.B.—Above works having been recently enlarged, orders of any magnitude for HOME or EXPORT Trade will receive immediate attention.

C. & W. WALKER'S

WOOD PURIFIER SIEVES,

Which have now been used for twelve years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS,

DONNINGTON, NEAR NEWPORT, SHROPSHIRE;

8, FINSBURY CIRCUS, LONDON.

TROTTER, HAINES, & CORBETT,

BRETTELL'S ESTATE

FIRE CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.

Successors to

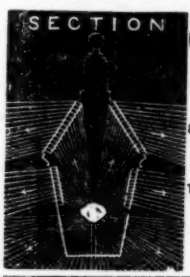
E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

CLOTH GAS-BAGS FOR MAINS.

As supplied to the Imperial, Chartered, and other London and Provincial Gas Companies. Bellows and Valves for Inflating Well Dresses, Stokers Gloves, India-Rubber Suction and Delivery Hose, Gas-Tubing, Leather India-Rubber and Gutta-Percha Machine-Bands, Sheet and Washers and Steam Joints.

T. BUGDEN, Manufacturer,

79, GOSWELL ROAD, LONDON, E.C.



THE PATENT

CATOPTRIC LAMP

Is now in Moorgate Street, Cheapside, and Trafalgar Square, and has been in successful operation upon Waterloo Bridge since Oct. 7, 1871.

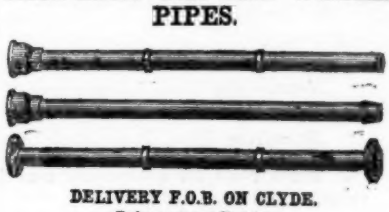
T. A. SKELTON, 37, Essex St., Strand, LONDON, INVENTOR AND PATENTEE.

GAS AND WATER PIPES.

WILLIAM MACLEOD & CO.,

18 & 20, ALSTON STREET, GLASGOW.

CAST-IRON GAS AND WATER PIPES.



DELIVERY F.O.B. ON CLYDE.

Prices on application.

MOBBERLEY & PERRY,
THE HURST
FIRE CLAY and BRICK WORKS,
STOURBRIDGE.

Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAY.
Manufacturers for Home and Export.
GAS-RETORTS, GLASS-HOUSE FURNACE,
BLAST-FURNACE, & TANK BRICKS, LUMPS, TILES,
And Every Description of Best Fire-Bricks.

C. & W. WALKER,
MIDLAND IRON-WORKS,
DONNINGTON, NEAR NEWPORT, SHROPSHIRE,
MANUFACTURERS OF
TELESCOPIC AND SINGLE-LIFT
GASHOLDERS,
CAST & WROUGHT IRON GASHOLDER-TANKS,
CONDENSERS, SCRUBBERS, & PURIFIERS.
LONDON: 8, FINSBURY CIRCUS, E.C.

THOMAS READ & CO.,
BRAZILIAN IRON-WORKS,
MALTON, YORKS,
MANUFACTURERS OF
GAS and WATER PIPES,
Bends, Tees, and Irregulars,
AND
GENERAL FOUNDERS.
ESTIMATES and PRICES on APPLICATION.

G. J. EVESON,
GAS COAL MERCHANT,
STOURBRIDGE.
Delivery per Rail to any Part.

THE WIGAN COAL AND IRON COMPANY,
LIMITED,
COLLIERY PROPRIETORS,
(HEAD OFFICES: WIGAN, LANCASHIRE;
DISTRICT OFFICE:
18, BENNETT'S HILL, NEW STREET, BIRMINGHAM,)
Supply the Best Wigan Arley Mine Gas Coal & Nuts,
THE BEST HAND-PICKED ROUND CANNEL,
ALSO SMALL OR GAS CANNEL, &c., &c.

GEORGE ORME & CO.,
GAS METER MANUFACTURERS, BRASSFOUNDERS & FINISHERS,
ATLAS METER-WORKS, OLDHAM.
CONSUMERS WET & DRY GAS-METERS ON THE MOST APPROVED PRINCIPLES.
STATION-METERS, GOVERNORS, PRESSURE-REGISTERS,
And every Description of Gas Apparatus.
GAS, STEAM, AND WATER FITTINGS.

Established

1795.

JOSEPH CLIFF & SON,
THE ORIGINAL
WORTLEY FIRE-BRICK WORKS,
NEAR LEEDS,
MANUFACTURERS OF ALL DESCRIPTIONS OF
FIRE GOODS, and Salt-Glazed Drain-Pipes.
LONDON WHARF:
Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;
LIVERPOOL—1, Back Leeds Street,
Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

MESSRS. NEWTON, CHAMBERS, & CO.,
THORNCLIFFE IRON-WORKS AND COLLIERIES,
NEAR SHEFFIELD,
STRONGLY RECOMMEND A TRIAL OF THEIR
CELEBRATED SILKSTONE GAS NUTS.
Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—
(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.
Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.
These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.
APPLICATIONS FOR PRICES, &c., TO BE SENT DIRECT TO THE COLLIERY, AS ABOVE.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
173, ST. VINCENT STREET, GLASGOW.

RUSSEL'S BOGHEAD.

MUIRKIRK, No. 1, CANNEL
Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

MUIRKIRK, No. 2, CANNEL
Yields 10,700 cubic feet of 32·77-candle gas per ton, and 9½ cwts. of coke, containing 11 per cent. of ash.

OLD WEMYSS CANNEL
Yields 13,320 cubic feet of 32·5-candle gas per ton.
Prices and full Analyses on application.

GAS COAL
Of every description delivered f.o.b. United Kingdom, or cost freight and insurance Abroad, upon lowest terms.
Contracts undertaken for the Shipment, Insurance, and Delivery Abroad of Plant and Materials for Gas and Water Works, &c.
THOMAS BROCKELBANK & CO.,
Coal Exporters and Ship and Insurance Brokers,
115, LEADENHALL ST., LONDON.

POPE & PEARSON'S GAS COAL.—We have now the authority of several of the most eminent Gas Engineers of London in stating that our Coal yields *in practical working over 10,000 cubic feet of gas, with an illuminating power of 16 candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.
One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.
For further particulars, apply to POPE AND PEARSON, West Riding and Silkstone Collieries, near LEEDS.

THE EARL OF HUME'S
LESMAHAGOW
MAIN SEAM CANNEL COAL.
CRAIGNETHAN GAS COAL CO.,
LESMAHAGOW, N.B.
Analysis and Price on Application.

SCOTTISH CANNEL COAL.
J. & W. ROMANS,
GAS ENGINEERS AND COAL FACTORS,
CONTRACT FOR SUPPLYING ANY QUANTITY
OF
GAS, HOUSE, AND STEAM COAL,
AND
CANNEL;
Also for every sort of
GAS APPARATUS AND FIRE GOODS.
FOR PRICES, &C., APPLY TO THE OFFICES,
30, ST. ANDREW SQUARE, EDINBURGH.

THE
HUCKNALL COLLIERY COMPANY
Can offer a CANNEL COAL yielding a large quantity of Gas of superior quality.
Prices and information on application to the HUCKNALL COLLIERY COMPANY, Hucknall Torkard Collieries, near NOTTINGHAM.

SCOTCH GAS COALS.
ROBERT CRAWFORD & CO.,
COLLIERY AGENTS,
STIRLING, N.B.,
Supply or Contract for all the principal
SCOTCH CANNELS AND SPLINTS F.O.B. Scotland; or cost, freight, and insurance abroad.
Being Sole Agents for London and the Southern Counties, they can offer upon the very lowest terms.
English Coal also supplied.
Full Analysis and Prices on application.
LONDON ADDRESS:
8, COLVESTON CRESCENT, DALSTON, E.

WYLAM WOOD COAL COMPANY,
LIMITED,
WYLAM-ON-TYNE.
WYLAM WOOD CANNEL COAL WORKED FROM ABOVE COLLIERY.
Analysis—10,280 cubic feet of gas per ton of Coal, having an Illuminating Power of 26·2 Sperm Candles, and yields 13¼ cwt of Coke per ton of Coal.
PORTS OF SHIPMENT:
TYNE DOCK AND NORTH DOCK, SUNDERLAND.
For prices and further particulars, apply to
UTRICK ALEXANDER RITSON,
6, QUEEN STREET,
NEWCASTLE-ON-TYNE.

CANNEL COAL.
COPPA COLLIERY, MOLD,
Beg leave to call the attention of Gas Companies to the superior quality of their
CANNEL FOR GAS-MAKING PURPOSES.
This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 33-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.
Ports of shipment—Birkenhead or Connah's Quay.
Waggons supplied for delivery by railway to any part of England or Wales.
For particulars, prices, and rates of freight, apply to The Coppa Colliery, Mold, FLINTSHIRE.

SCOTCH CANNEL COALS.
The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.
JAMES M'KELVIE,
CANNEL COAL MERCHANT,
HAYMARKET, EDINBURGH.
Established 1840.

LEE and JERDEIN,
COAL OWNERS & MERCHANTS.
Chief Office:
9, LANCASTER PLACE, STRAND, LONDON, W.C.
SOLE VENDORS FOR
LONDON & THE SOUTHERN COUNTIES
OF
WIGAN COAL AND CANNEL,
From the Mines of the
INCE HALL COAL & CANNEL COMPANY, Limited,
AND
Messrs. W. H. BRANCKER & Co.

PLUTONIC CEMENT,
For REPAIRING RETORTS while in ACTION, &c.
SOLE MANUFACTURER,
WILLIAM RICHARDSON,
GAS AND HYDRAULIC ENGINEER,
93 & 94, CHARLES HENRY ST., BIRMINGHAM.

THE LOCHORE AND CAPLEDRAE CANNEL COAL COMPANY, LIMITED.

Works: LOCHORE by LOCHGELLY, FIFESHIRE. Office: 19, MAITLAND STREET, EDINBURGH.

This Company request attention to the very superior quality of their Cannel Coals.

1. The following are the practical results given by Dr. Wallace, of Glasgow, of analyses of their Lochore and Capledrae Cannels:—

	Sample worked at Capledrae.		Sample worked at Lochore.
Gas per ton of coal, at 60° Fahr. and 30 inches barometric pressure	13,095 cubic feet.	..	11,760 cubic feet.
Illuminating power, in standard sperm candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	32·91	..	34·83
Value of 1 cubic foot of gas in grains of sperm	780	..	836
Equivalent of a ton of coal in pounds of sperm candles	1,459	..	1,404
Durability of 1 cubic foot by 5-inch flame	69 minutes.	..	71 minutes.
Gravity of the gas (air = 1000)	596	..	594

Remarks.—This (the sample from Capledrae) is a Cannel Coal of first-class quality, giving 13,000 feet of 33-candle gas. It contains only a minute proportion of sulphur, and the ash is almost quite white. The coke is of rather inferior quality.

Remarks on Sample from Lochore.—This is a Cannel Coal of first-class quality, giving a large yield of very rich gas and a coke of medium quality.

2. The following are the practical results of analyses by Dr. Wallace of the Company's Waverley Cannels:—

	Capledrae Waverley.		Lochore Waverley.
Gas per ton of coal, at 60° Fahr. and 30 inches barometer	9,120 cubic feet.	..	11,145 cubic feet.
Illuminating power, in standard candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	36·62	..	33·09
Value of 1 cubic foot of gas in grains of sperm	878	..	794
Equivalent of a ton of coal in pounds of sperm candles	1,145	..	1,264
Durability of 1 cubic foot of gas by 5-inch flame	80 minutes.	..	67 minutes.
Gravity of the gas (air = 1000)	677	..	597

Remarks on the Sample of Capledrae Waverley.—This Coal gives fully 9000 feet of gas of 36½ candles, and is admirably adapted for bringing up the quality of gas made from common coal or inferior qualities of cannel. The tests were made at a rather high temperature, this being one of the coals that stand a very high heat without serious diminution of the illuminating power of the gas The coke contains 60 per cent. of ash, and is therefore almost valueless, but the proportion of sulphur is very moderate.

Remarks on the Lochore Waverley.—This is a first-class Cannel Coal, giving 11,000 cubic feet of 33-candle gas. The quantity of sulphur is very minute, and the ash is nearly white. The coke is of inferior quality, but not wholly valueless.

Applications for full Copies of Analyses and Prices may be made to the Company, at

19, MAITLAND STREET, EDINBURGH.

CROLL'S
DRY GAS-METERS,

PRIZE MEDALS.
LONDON, 1851;
NEW YORK, 1853;
PARIS, 1855.

(INVENTED & PATENTED IN 1844,)

COMBINING ALL THE LATEST IMPROVEMENTS,

MANUFACTURED ONLY BY

PRIZE MEDALS.
LONDON, 1862;
DUBLIN, 1865;
PARIS, 1867.

THE GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON, N.E.

ALEXANDER WRIGHT & CO.,

MANUFACTURERS OF

"WET" & "DRY" GAS-METERS

Of the highest excellence.

STATION-METERS AND GOVERNORS.

STREET-LAMP REGULATORS.

TESTING APPARATUS

Of the most perfect description for all purposes relating to Gas.

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.

R. LAIDLAW AND SON,

EDINBURGH AND **GLASGOW.**

Manufacturers of

CONSUMERS IMPROVED WET GAS-METERS,

THE UNVARYING WATER-LINE GAS-METERS,

IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;

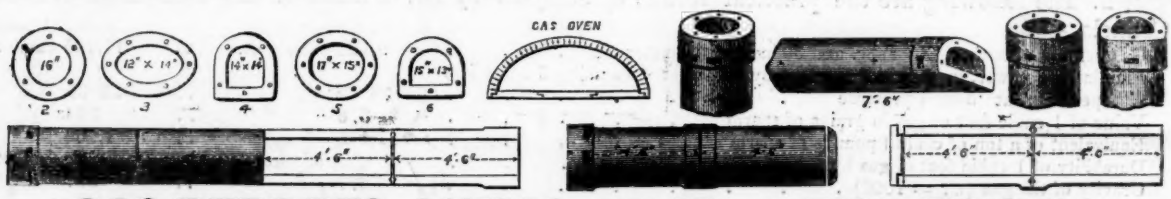
STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges,
Governors, Test Holders, &c., &c.

LONDON OFFICE: 106, CANNON STREET, E.C.

HARRIS & PEARSON,

FIRE-CLAY AND BRICK WORKS, STOURBRIDGE.



GAS-RETORTS, LUMPS, TILES, & FIRE-BRICKS,

OF EVERY DESCRIPTION.

A LARGE ASSORTMENT OF GAS-RETORTS IN STOCK.

STOCK FOR EXPORT READY AT THE WORKS, AND AT ELLESMERE PORT.

London: Printed by WILLIAM BOUGHTON KING (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, February 9, 1875.